GEOGRAPHY,
RESOURCES & INDUSTRIES

EDISON ELECTRIC INSTITUTE BULLETIN

SEP 27 1941

SEPTEMBER, 1941

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EDISON ELECTRIC INSTITUTE

THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

June, 1941

SOURCE AND DISPOSAL OF ENERGY—MONTH OF JUNE

	1941	1940	%
GENERATION* (Net)			
By Fuel Burning Plants	9,614,394,000	7,272,166,000	+32.2
By Water Power Plants	4,056,437,000	4,216,697,000	− 3.8
Total Generation	**13,670,831,000**	**11,488,863,000**	**+19.0**
Add—Net Imports Over International Boundaries	74,891,000	77,836,000	− 3.8
Less—Company Use	218,493,000	133,411,000	+63.8
Less—Energy Used by Producer	296,010,000	406,345,000	−27.2
Net Energy for Distribution	**13,231,219,000**	**11,026,943,000**	**+20.0**
Losses and Unaccounted for	1,846,417,000	1,548,200,000	+19.3
Sales to Ultimate Customers	**11,384,802,000**	**9,478,743,000**	**+20.1**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of June 30th			
Residential or Domestic	25,449,311	24,458,292	+ 4.1
Rural (Distinct Rural Rates)	951,202	667,676	.....
Commercial or Industrial:			
Small Light and Power	4,282,921	4,253,022	+ 0.5
Large Light and Power	173,570	179,625	
Other Customers	117,082	112,505	.....
Total Ultimate Customers	**30,974,086**	**29,671,120**	**+ 4.4**
KILOWATTHOUR SALES—During Month of June			
Residential or Domestic	1,909,221,000	1,798,615,000	+ 6.1
Rural (Distinct Rural Rates)	230,945,000	211,160,000	+ 9.4
Commercial or Industrial:			
Small Light and Power	1,980,290,000	1,799,407,000	+10.1
Large Light and Power	6,385,480,000	4,827,233,000	+32.3
Street and Highway Lighting	137,917,000	129,890,000	+ 6.2
Other Public Authorities	239,683,000	215,133,000	+11.4
Railways and Railroads:			
Street and Interurban Railways	296,877,000	293,445,000	+ 1.2
Electrified Steam Railroads	164,292,000	145,663,000	+12.8
Interdepartmental	40,097,000	58,197,000	−31.1
Total to Ultimate Customers	**11,384,802,000**	**9,478,743,000**	**+20.1**
Revenue from Ultimate Customers	**$215,010,100**	**$195,785,000**	**+ 9.8**

RESIDENTIAL OR DOMESTIC SERVICE (Revised Series)

AVERAGE CUSTOMER DATA—For the 12 Months Ended June 30th			
Kilowatthours per Customer	968	925	+ 4.6
Average Annual Bill	$36.69	$36.17	+ 1.4
Revenue per Kilowatthour	3.79¢	3.91¢	− 3.1

* By courtesy of the Federal Power Commission

Vol. 9, No. 9, EDISON ELECTRIC INSTITUTE BULLETIN; published monthly. Entered as second-class matter Aug. 17, 1933, at the post office at Philadelphia, Pa., under the act of March 3, 1879. Publication office, 56th and Chestnut Sts., Philadelphia, Pa. Editorial office, 420 Lexington Ave., New York, N. Y. Subscription rate $2.00 per year in the United States; $3.00 per year in foreign countries.

The Edison Electric Institute does not assume responsibility for, nor necessarily endorse or approve, statements made by contributors to the BULLETIN.

EDISON ELECTRIC INSTITUTE BULLETIN

Volume 9 SEPTEMBER, 1941 No. 9

Building Business Through Good Citizenship

By H. C. Thuerk
President, Bradford Electric Company

"Oysters are better than ever this year!
Add variety to your menu by serving them often
Production of OYSTERS is an important local industry"

THIS is not an extract from a promotion bulletin of a local Chamber of Commerce, nor is it an advertisement of a progressive seafood house. Instead it is a message of a utility company which was addressed to all of its customers and carried to them on a monthly bill for service.

This oyster incident is but another testimonial to the growing conviction among the progressive leaders of our utility companies that it is worthwhile today for us to take a more active part in promotion of the economic and civic welfare of the communities we serve.

It is unnecessary to stress that the utilities are not engaged in an ordinary business. Because of the inherent characteristics of the utility business we find that the public and our customers assume an attitude which they do not hold toward the ordinary commercial enterprise. The characteristics of the utility business make it extremely important and in many ways necessary for us to give more than passing thought to ways and means of so conducting our business as to earn the approbation of our customers. Experience has shown that to merit this approval we must go beyond the rendering of dependable service at the lowest possible rates. Many companies in recent years have found themselves faced with proposals to establish municipally operated systems in areas where there have been relatively low rates and where a most reliable type of service has been given.

That these statements fairly well represent the feeling of our customers has been brought out effectively by a number of surveys conducted by Mr. Elmo Roper, Distribution Consultant of New York. Mr. Roper maintains that the customer forms three separate judgments of you as a utility company. He thinks of you first as a seller and here your price and service are important. Then he judges you as a neighbor, as to whether you possess courtesy and other neighborly qualities. Finally, he sizes you up as a citizen—as to whether you help or hurt his community. And his overall opinion of you is a composite of these three judgments.

Perhaps we feel that people's opinion of us is influenced more by the buyer-seller relationship than the judgments on neighborliness and citizenship. However, Mr. Roper found that in many communities, being a good neighbor as exemplified by courteous treatment and being a good citizen as exemplified by actively promoting the welfare of the city, weighed much more heavily in the minds of the people than did the buyer-seller relationship. It is therefore evident that a customer's opinion of its utility company is greatly influenced by the part which that utility plays in developing and promoting the welfare of the communities it serves.

If our customers in ordinary times evaluate us in terms of our interest in the communities we serve, it is a pretty safe statement to make that under present day conditions brought about through the need for an adequate national defense program, this yardstick would be even more pronounced. Surely this is a time when every loyal American citizen and institution is prepared to contribute its support to adequate preparations for the defense of this country and to my mind our utilities now have an unusual opportunity to demonstrate the breadth of their citizenship.

No local industry is more dependent for its livelihood on the general welfare of a community than is a utility company. The company shares in its prosperity and suffers with it during periods of adversity. There is, therefore, full justification for the utility company to work hand in hand with civic groups and agencies in developing its service areas, realizing that as these areas grow and develop, purchasing power increases and additional business accrues to the company. Not only will the utility have the opportunity to obtain additional industrial business from new and expanded factories but the additional payrolls will provide the basis for increased domestic and commercial revenues. More and better street lighting will be needed and additional service will be required from schools and municipal operations.

No state, no community can ever afford to stop planning, developing and expanding. A rapidly growing community is continually going through periods of political and economic adjustments as a part of the process of building. It must invoke modern methods in everything it undertakes and its tempo must be continually stepped up. It must guard against human depreciation within its borders and inculcate initiative and the "will to do" that will make it a place in which a man will want to live and rear his family. To grow and be prosperous. the community must seek new activities, new business establishments, new industries and the creation of new business resources before those it has, have become obsolete or depleted of usefulness.

Every community has aspirations to become a better and more prosperous place in which to live. The problem of how to accomplish this will vary among towns and cities. Every community or area, however, has a dominant characteristic that may be found in its industries, its commercial attainments, its recreational facilities, its historic associations, its cultural achievements, its intellectual pursuits and any number of other distinguishing features peculiar to the section in which it is located. All of these make up its civic personality.

Boston has its factories and shipping, its historical romances, its old families, its literature, learning and possibly, not least, baked beans. Pittsburgh has its steel, coal, its great research laboratories, its smoke and hills. Chicago has its railroads, its commercial distribution facilities, its beautifully developed lake front, its wind.

Milwaukee has its beer, Detroit its automobile industry, St. Louis its factories, its wholesale distribution, its geographic key location leading to the new southwest. The growth of all of these fine cities was made possible by the industry and enterprise of their citizens.

In like manner, the opportunity is ever present for a community to determine by careful analysis and study the characteristics which make up its own civic personality and how these can be developed and promoted for the benefit of its citizens. The desire for improvement is almost universal and there are usually many willing hands ready to serve when the opportunity is presented in the form of a practical program.

In many communities there is a lack of knowledge of how to proceed. What is needed is a plan, intelligent leadership and cooperation of local agencies. Here is where the utility company can be of real service by making available its own information on the community, assisting in preparing a plan, helping in obtaining the cooperation of all civic organizations and furnishing leadership and assistance consistent with its resources. The utility company can be particularly helpful in assisting its communities in the development of industries and enterprises economically adapted to the areas. Such guidance will insure the obtaining of industries which will be relatively permanent, a procedure of extreme importance today in view of the influence of the National Defense Program.

The participation of a utility company in such activities will indicate its willingness and desire to strive for better citizenship. Many of us feel that there is a definite correlation between public acceptance of a company and the use of electricity.

Cooperation by the utility company in a community development program will tend to develop a greater civic consciousness in the minds of its employees, all of which will make for more effective and economical municipal and civic administration.

Participation with civic and municipal bodies in a coordinated effort to develop a community through industrial growth will make it possible to bring attention to the need for keeping taxes low if industries are to be retained and new ones attracted. Not so long ago I learned of a city which, in its desire to hold its present industries and to attract new enterprises, reduced the assessed valuations of industrial property 50 per cent.

It is almost needless to say that cooperation of this type is predicated on a sound policy of company management. The company must be giving good service at fair rates. It must have employees who are good citizens and who daily carry out their good citizenship through courteous and efficient treatment of customers.

A few instances of what some utilities have done in the past in their desire to be of help in promoting the welfare and growth of their communities may be of interest. In mentioning these examples I have included information collected by the Community Development Committee of the American Gas Association, a committee which was appointed in the fall of 1939 for the purpose of making available to gas companies the experiences of others in activities and programs of this type.

I have already referred to one company which has begun a program of promoting greater consumption of local products by advertising the Epicurean appeal of the oyster. You will be interested to know that as a result of receiving this message on his service bill, an official of one of our southern states in a radio talk read the message and then said:

"This Power Company recognizes the importance of developing any local industry. The more prosperous the people of the territory served by it, the more there will be to enjoy the benefits and luxury of lights and electrical services. So far as I know this is the first company of this kind ever to boost oysters. It would be a fine thing if other companies, business concerns, et cetera, of Tidewater went to a little trouble and expense to promote the production and consumption of this delicious article of food. I salute the Eastern Shore Public Service Company, and shall pay my bills more promptly and with a better taste in my mouth, in the future."

Many other favorable responses came from the seafood industry and from many municipal officials, all of whom seemed appreciative of the company's efforts to promote locally grown and produced products. As a result of these responses the company's bills for service for the two subsequent months carried messages designed to stimulate a greater consumption of chicken and promote the idea of helping the canners sell more canned goods. Chicken raising and canning are two of the principal industries in the company's territory.

In Portsmouth, New Hampshire, one utility assisted in a material way in the preparation of a report dealing with the development of its harbor.

Some of you may be familiar with the editors' essay contest conducted by the Oklahoma Natural Gas Corporation among all of the newspapers of Oklahoma. Prizes were awarded for the best papers on the subject "Where Ahead Lies Oklahoma's Greatest Opportunity and How Can We Obtain It?" The newspapers of Oklahoma were most generous in their praise of this constructive activity. This program aroused so much interest that the company in 1940 conducted a contest on the subject "The Cost of Accidents Is Human Misery—How Can They Be Eliminated in Oklahoma?" This contest received wide publicity throughout the state, and has done a great deal to place the company's organization in the position of not only being interested but also of taking an active part in the welfare of the citizens of the state.

Some such philosophy must also pervade the utility company in the mid-west whose interest in public safety brought the glitter of Hollywood into the experience of one of its executives. Here is the way the New York *Sun* described the incident:

"Recently in a busy Mid-Western city the vice-president of a large public utility company found himself turned chauffeur for a screen star, her mother, and the Governor of the State, whom he drove lickety-split to the accompaniment of sirens and police escort to the public fair grounds.

"The executive, it seems, rated the honor because he was also the chairman of the Mayor's advisory committee on public safety."

In another southern state, a utility conducted an activity to encourage more and better hog raising in the territory served by the company. Sixteen registered boar-pigs were awarded condition-

ally to leading farm boys in sixteen counties.

Another company in Florida, serving a territory in which 30 per cent of the population's income is derived from the citrus industry, carried on a program to promote greater consumption of citrus fruits.

Many companies the country over have rendered helpful and constructive services to their communities by making available certain of their facilities for meetings, and exhibits of civic and commercial organizations. In April of last year, the gas company in Muskegon, Michigan, arranged for a flower show in its show and home service rooms with the cooperation of the Muskegon Florists' Association. During the three days of the show, over 13,000 people attended in a city of about 40,000 population. The company received so much favorable comment on its civic spirit in providing a worthwhile attraction, that it conducted a similar show recently.

If space permitted the summer symphony concerts and evening concert broadcasts sponsored by several utility companies on the Pacific Coast could be discussed as well as the numerous instances of utility companies which have organized better business institutes for the purpose of teaching the fundamentals of salesmanship to the employees of all commercial and industrial concerns in the territory served by the utilities.

There are many examples all around us of companies which have helped communities materially to retain existing industries and to attract new ones. It has generally been accepted as sound policy in a program to promote the industrial, agricultural or recreational development of an area, to first of all acquaint its citizens with the natural advantages of the community for development and with the industries and enterprises which are now located in the area. A splendid example of this procedure was the program of a utility in New York State which ran a series of newspaper advertisements in 1939 and 1940 describing in a most interesting way the most important industries in its territory. The company planned to put these stories into pamphlet form for use in its efforts to attract new enterprises.

You can add from your own experience many more such examples but these few instances will serve to show that there are innumerable ways in which we can be of help to our communities.

These examples have been presented in the hope that they may form a background for all of us in determining the types of activities which will be of greatest assistance to our communities during the period when the National Defense Program is in force. Many communities will be faced with new problems and efforts will be made to solve them in a manner most beneficial to their citizens. One outstanding example of an activity resulting from the defense Program is the machine tool survey made in the city of York, Pennsylvania, as an aid to bringing additional defense orders to the community. Several utility companies have already assisted their communities by making extensive surveys of the availability of labor and raw materials, as well as of machine tool equipment, and desirable factory sites. There are undoubtedly many varied types of activities which can be discovered and inaugurated through intelligent and careful investigation and which would be particularly helpful during the present national emergency.

Participation in activities of this type will contribute greatly to establishing the ability of utility companies to render intelligent advice to their customers as to the proper course to follow as preparation for the always critical post-war period. It probably goes without saying that if a utility is considered a good citizen its technical advice will receive a much higher degree of respect than if it is not so considered.

Let us suggest that the most successful accomplishments in the field of community development have been brought about where there has been a desire on the part of the utility to contribute its share in the promotion of sound economic and civic development of the communities it serves. In each of these instances a plan has been carefully prepared and then presented for approval and support to all organizations and individuals interested in seeing it carried out to a successful conclusion. And finally as the plan progresses, the citizens of the community are kept informed through the use of newspaper advertising and direct contacts.

All of us point with pride to the marked advance which has taken place in the standard of living in this country. In the words of Dr. Bernhard Ostrolenk, Professor of Economics at the College of the City of New York, the American people in 1939 were, "better fed, better clothed, had more invisible servants in the form of electricity in their homes, had more electrical appliances to make household work easier, educated their young people better as measured by the numbers attending high schools and colleges, traveled more as measured by the number of automobiles and gasoline consumed, read more, smoked more, lived longer as measured by the death rate, more young people married and more of their infants survived" than at any time in the history of the country. It is generally agreed that this accomplishment has been made possible through continued increase in the productive capacity of the individual worker. That increased productive capacity has been brought about largely through the ever increasing application of power to modern processes.

I like to feel that the industrial salesmen, particularly, of our electric utilities have played a most prominent part in convincing the executives of our manufacturing industries of the value of using increased quantities of power and thus through their efforts have contributed materially to the improvement in our standard of living.

With this background of accomplishment it seems to me that our chief executives and our industrial sales executives well understand the value and importance at this time of encouraging and cooperating in the preparation and conduct of sound community development programs. Here then is an opportunity to continue the leadership that has been so ably displayed in the past.

Georgia Power Sponsors Documentary Farm Film

TO help carry the story of the advantages of electric service to farm families, the Georgia Power Co. has enlisted the medium of motion pictures with sound and color. The company cooperated with the Georgia Agricultural Extension Service in the production of a 30-minute colored sound film entitled "Our New Farm."

An "All Georgia" picture, it is the first of a series to be produced and distributed by the Georgia Agricultural Extension Service in its new visual education program. The picture visualizes and describes the ways a typical Georgia rural family adds to its comfort and income by putting electricity to work on an old fashioned farm.

"Our New Farm" is being shown to rural groups in Georgia at an extensive series of community meetings conducted by county agents and home demonstration agents.

PRIZE AWARDS IN 1942

Administered by Edison Electric Institute

The Prize Awards Committee of the Edison Electric Institute is pleased to announce the following prize awards, offered for open competition by all electric light and power companies in the United States, or by employees of the companies. Closing date for entries in the several contests is April 1, 1942. Please note that most awards cover acts or accomplishments occurring during the calendar year 1941. Detailed information on each of the awards may be obtained from the Secretary of the Edison Electric Institute, 420 Lexington Ave., New York, N. Y.

Of Interest to Chief Executives

CHARLES A. COFFIN AWARD—Advancement in Operation and Plant

A gold medal, known as the Charles A. Coffin Medal, donated by General Electric Company, is offered for the year 1941 to the public utility operating company, within the United States, which has achieved the greatest advancement in its operations and physical plant, thereby making a distinguished contribution to the development of electric light and power for the convenience of the public and the benefit of the industry. The company awarded the medal will also receive $1,000 for its employees' benefit or similar fund.

THOMAS W. MARTIN AWARD—Rural Electrification

A bronze plaque is offered by Mr. Thomas W. Martin, President, Alabama Power Company, to the public utility operating company within the United States which during the year 1941 has shown the greatest contribution to agricultural advancement within the company's territory through promotion of uses of electricity, development of rural load, cooperation with other agencies, extension of rural lines, organization and planning for development of rural electrification.

CLAUDE L. MATTHEWS AWARDS—For Valor

For acts of devotion to duty by public utility company employees wherein outstanding courage has been shown in efforts to maintain important electric service or to restore service in the shortest possible time, three cash awards of $150 each are offered for the year 1941 by Mr. Claude L. Matthews, Vice President, W. N. Matthews Corporation. A citation and an appropriate lapel decoration will accompany each cash award.

Recommendation for the award must be submitted by the President or acting executive head of the company in which the person recommended is or was employed, and it is urged that such recommendation be submitted as soon as convenient after occurrence of the act of valor.

Of Interest to Sales Executives

AUGUSTUS D. CURTIS AWARD—Lighting of Commercial Buildings

Certificates and cash prizes, donated by Messrs. Darwin Curtis and Kenneth Curtis of Curtis Lighting, Incorporated, in memory of Augustus D. Curtis, are offered for distinguished contributions by public utility operating companies toward the advancement of higher levels of illumination in the interiors of commercial buildings during the twelve months ending March 1, 1942. First prize: a certificate to the winning company and $200 to the individual responsible for the achievement. Second prize: a certificate to the company and $100 to the individual responsible. Third prize: $50 to the individual responsible for the achievement. Fourth prize: $25 to the individual responsible for the achievement.

GEORGE A. HUGHES AWARD—Domestic Electric Cooking Load

Three prizes are offered by Mr. George A. Hughes, Chairman, Edison General Electric Appliance Company, Inc., for distinguished contributions made during 1941 by public utility operating companies within the United States to the development of the market for electric ranges through direct or cooperative promotion or selling, or both. First prize: to the company, a trophy; to the individual or individuals responsible, $500. Second prize: to the company, a certificate of recognition; to the individual or individuals responsible, $300. Third prize: to the company, a certificate of recognition; to the individual or individuals responsible, $200.

LAURA McCALL AWARD—Achievements of Home Service Departments

An engraved plaque, two illuminated parchments and a total of $175 in cash, donated by McCall's Magazine in memory of Laura McCall, are offered for outstanding achievements by the Home Service departments of operating public utility companies in the advancement of electrical living in the home through the promotion of electrical appliances and home lighting equipment. Companies winning first, second and third prizes will receive, respectively, the plaque and the parchments; the Home Service Directors or the directing heads of the Home Service departments reporting the achievements will receive the three cash prizes, which are $100, $50 and $25. The contest period is the calendar year 1941.

Of Interest to Engineers

McGRAW PRIZES . . . . . Engineering

Cash prizes of $250, $150 and $100 donated by Mr. James H. McGraw, Honorary Chairman, McGraw-Hill Publishing Company, are offered for the three most meritorious papers submitted on any Engineering or Technical Subject relating to the Electric Light and Power Industry.

Leaflets covering the McGraw prizes are available. Executives are invited to request from the Secretary of the Institute copies for distribution to members of engineering staffs.

All papers, exhibits or statements submitted in competition for the 1942 prizes must be forwarded to the Secretary, Edison Electric Institute, 420 Lexington Avenue, New York, N. Y., by April 1, 1942.

All prizes will be announced and awarded at the 1942 convention of the Edison Electric Institute.

PRIZE AWARDS COMMITTEE

H. P. LIVERSIDGE, *Chairman* JAMES E. DAVIDSON
CHARLES W. KELLOGG LEWIS B. BEATTY, *Secretary*

Looking Forward

By Sarah M. Sheridan
Vice-President, The Detroit Edison Company

A talk before the Michigan Electric Light Association

WE who gain our livelihood through employment in the utility industry are fortunate. For the most part we work under conditions that should make for the best development in men and women. Both gas and electric utilities are vital to the communities they serve. They are industries that require outstanding ability in their operators. It is important, it is imperative, that they be carried on under highly ethical standards. All of our operations are clean, wholesome, decent. They give the individual the finest opportunity for giving his best. Therefore, as a group we should be intelligent, upright, courageous, and have honest pride in our work. Moreover, we should be aware that the advantages we enjoy, lay upon us grave responsibilities and obligations.

Monopoly is one of the great advantages of the utility—but at the same time it's an "Achilles Heel." As monopolies our industries are naturally open to criticism. Often they may be objects of envy. As monopolies, we, the utilities, should be willing and ready to take all constructive criticism and profit by it through setting right what is wrong. We should be ready and able to answer unjust criticism. I believe that these things are done by most utilities. Also most utilities operate their businesses in a just manner, taking care of the public that depends upon them without favor, with good service at reasonable prices, and with fair and courteous treatment.

It may well be that our industry is facing its crucial years. It has often been pointed out that a business, like a human being, goes through a life cycle. First, there is the period of youth and rapid growth. Second, comes maturity, when we consolidate the gains of youth and become substantial and secure—and perhaps complacent. Third, there is the phase of middle age with its rigidity, which may prophesy decline. Which phase are we in?

Complacency is a real danger in a noncompetitive business. Complacency means that the drive and incentives that inspire human beings to build a better mouse trap, to write a better song, or to cut new roads through the forest of ignorance, are dead. Progress is no accident. Improvements don't just happen. God makes laws and men discover them. And man puts the laws to work to make our planet a more comfortable, a happier, and a safer habitation for himself and his heirs and for uncounted generations.

Thus complacency, that is to be satisfied with a status quo, to twiddle our thumbs and say, "All is for the best in the best of possible worlds," means that we are "going no place fast." I do not believe that complacency has been too great a sin of the public utility industry. The gas industry for one hundred fifty years and the electric industry for more than fifty years have been progressive and successful. They have enjoyed increasing demands from the public for their services, which meant rapid growth, cheaper prices, and a growing list of new devices for new services to the community.

Who, fifty years ago, would have dreamed of gas refrigeration or gas incinerators, or time by telechron clocks, or radio broadcasting to bring the news of the world to your elbow? But have we, the operators, done this? Or has it been a matter of natural development? Or could it have been done better?

Utility people are a rigorously selected group. Personnel is chosen from among the abler individuals of our population, so that it is incumbent upon us to demand of ourselves high performance, inventiveness, divine discontent, and specific contributions that will bring more service to more people at less cost. Competition is the antidote for complacency. The employees of a government agency or a public utility, including railroads, lack the competitive drive which spurs the personnel of other industries to achievement.

This is no idle speculation. All of us have observed symptoms of complacency in government and utility employees, and this complacency by any one responsible for a public service is very short-sighted. It overlooks the paramount fact in any monopoly's economy. That is, that of the four groups concerned, the customer, the owner, the employee, and the management, the customer is the most important factor. Without the customer there would be no business. The customer is the reason for organizing the business in the first place, for making it efficient, for expanding it, for creating new uses.

We cannot, nor do we wish to, overlook the real achievements of the utilities: the constant reductions of price in the face of increasing costs and taxes, continuity of service of the order of 99½ per cent, and the increasing number of things that gas and electricity are made to do for the public in homes, stores, and factories.

Also we may take just pride in our credit policies, our practice of carrying for long periods during difficult times the people who cannot pay their bills, and our liberal credit practice with those small businesses, with little capital, which are in the process of establishing themselves.

But are we doing all that we can do or should do—all that any other agency or group could do or would do in our place? Surely there is still room for improvements. If we are to continue to be useful we must improve our methods and our services. And let us hope that we will continue such improvements, not for purely commercial reasons; but because, by effort and achievement, we have an opportunity to make even greater contribution to the general good.

I believe that electricity is not cheap enough. I think that we have to go farther, be smarter, learn more about distributing and producing electricity, so that it may be delivered to the customer cheaper than he gets it today. So much cheaper that there may be no economic limit on his use of service up to any likely need for the service. Our services can do more to make life easy for the ordinary human being than any other service that I know of. They lighten his darkness—they lighten his labors. Other agents used similarly are in no ways comparable as to flexibility, cleanliness, safety and convenience. These services liberate humanity from toil. It is up to us to make them fully available so that they may be used freely and without stint.

How may we know that we are doing our best? What is there to do that we

haven't done? Let us examine the picture.

There are the elements of production, distribution, utilization, the development of new uses, personnel relations, and customer relations. Sometime in the future there is a chance, it may be remote but there is a chance, that ounces of U-235 will take the place of tons of coal. This seems fantastic today, but we must not disregard the fantastic that may become reality, or forget that in watching such a possibility we may find others, not so spectacular but usable and profitable.

In the electrical industry why can't we find a way to decrease the heavy cost of distribution? To abandon overhead distribution and use *present* cable practice would increase the cost of service to the customer many times. But there may be a way of distributing underground cheaply enough if we can find it, and who will search for it unless we do?

What other things can gas and electricity do for the health, safety and comfort of the customer? Gas and electricity can help him grow his own fresh vegetables in any climate the year around. They can help him beautify his horizon. And there are new uses in the experimental stages. But to do these things the price must be lower or the customer cannot afford to use gas and electricity generously. What further uses for man and his family can we make of electronics, radiation, and such photo-electric effects as the electric eye? Certainly light, heat and power are not the only things that gas and electricity can bring to the public. The use of electricity in industry has great possibilities, some not even thought of. We were not thinking of infra-red or high frequency uses five years ago. As for lighting, no matter how far we have progressed, and we have gone a long way, we have not yet achieved anywhere near satisfaction in lighting—much less perfection.

Who is going to take the responsibility for all these things? These are really the things that we should feel that we are paid to do.

Great progress has been made in power engineering. The reduction of coal consumption alone is spectacular. The development of the manufacture of lamps is epic. These may not be achievements of the utility operators alone, but we have helped to create the necessity for these accomplishments.

In our own organizations, do we coordinate and co-operate in all of our activities so that the efficiency of the business shall not suffer? Or do we let one department make changes that will embarrass or increase costs in another department? Do we duplicate work and effort because someone or some groups must maintain their importance? Do we let one division offer concessions or favors to one group of employees and overlook others in the same class?

These matters are difficult to keep track of, especially in big companies where authority and responsibility have to be widely delegated. But they are exceedingly important and involve costs, employee relations, overall efficiency, and the final effective functioning of the utility. Who will see to it that such mistakes are not made—unless we ourselves do?

The utility business began as a business of engineers and financiers because engineering and financing were the two greatest factors in the early development. The gas and electric operating companies, representing a capital investment of seventeen billion dollars, continue to attract the needed capital so that they must have been capably financed. Their record, the record of companies whose business is to provide service, has been free from bad influences having to do with the stock market. There are few instances where service has suffered because of financial manipulation. Service rendered by the operating companies has been good and rates have continued to decrease. The price of electric service has been determined by operating costs; speculation has been in quite another realm. Investors may have been concerned with the rise and fall of the market prices of public utility stocks; but customers have enjoyed an uninterrupted decline in the price of electric energy. The informed customers know this but the uninformed customers, and they are in the majority, mistakenly think that the financier is making his service cost more than it need cost.

Another point about the financing of utilities: In many properties large blocks of stock may be held by a few individuals or by one group. But more often much of the stock and most of the bonds are held by many smaller investors—in fact often by the customers themselves. So that more frequently than is generally supposed, ownership of the property is in the hands of many. These are two facts concerning utility finances that the public does not always understand. They are not matters that may be generally advertised, because so doing may seem to put the utilities in the position of defending matters that are not germane to operating a utility. But were they more generally understood, there would be less prejudiced criticism and more appreciation of the value of the utilities to the public. These are matters that a utility may by careful thought educate its public to understand, but it is a matter of *education*.

Another matter which the public does not generally appreciate, and I doubt that we remind them often enough, is the utilities' attitude toward State Regulation. State Regulation is a protection to the utility and to the customer alike. Fair-minded utilities have welcomed it, abetted it, and assisted it by many years of co-operation. Customers are entitled to know this, and to know that there are checks and balances continually in operation to protect their rights and curb the complacent attitude of utilities.

These first two problems—engineering and finance—go forward; the first under natural technical development and the second under controls that develop out of trial and error. Today we have time to look at problems such as utilization, personnel relations and public opinion. Are we complacent about the changing aspects in our industry, or are we learning the fundamentals of psychology, which is the new science we will need in addition to engineering and economics.

We brag a lot about American Democracy. Are we using the democratic principle in management? Are we making use of the new technique of group discussions where each man concerned, without fear or favor, makes his contribution to the solution of the problem? Does each employee concerned have the opportunity to contribute to making decisions which affect him? Or are we still so old-fashioned as to believe that management is the glorified Pooh-Bah —endowed with knowledge, power and ubiquity? I know departments in which no decision is made without every member affected, be he clerk or division head, being given the opportunity to participate in the solution of the problem, the marshaling of facts, the swapping of experiences. And I know others.

Do we sample our customers' opinions constantly according to present-day scientific methods in other matters of public opinion? Or do we depend upon our own employee reports and our own biased indices to find out what the customer wants from us and how he wants it? Are we open-minded on public opinion, or are we sure that we know just what the public wants, and that we have all the good will we need? Do we make sure that our customers get prompt and

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So You Know the Answers?

By Walter J. Thompson

Manager, Advertising Bureau, Buffalo, Niagara & Eastern Power Corporation

THIS is the age of the quiz program; where it is fun to stump the experts; where a wide and diversified store of dusty bits of what is often mistermed knowledge pays off in gold, encyclopedias, and high sounding praise. The Information Please, Quiz Kids, Ask Me Another, True Or False programs are riding high on the air waves and the man who knows whether or not Paul Revere's horse was a bay or a chestnut wins thunderous applause and a chance to participate another day. Yes, it's fun if you know the answers and so, Mr. Utility Expert, if you will step up to the microphone and try your luck, we'll see just how your guess checks with clearly defined public opinion on questions relating to your business.

While you are clearing your throat and girding your mental loins for this particular quiz, suppose we tell you what it is all about and how it happened.

Buffalo Niagara Electric Corporation of the Niagara Hudson group decided last year to find out exactly what their customers thought (*not* what their executives thought the customers thought) about the services being furnished to them; whether they understood their bills; what they thought about rates; did they know how much they paid for electricity each month; did they realize that the cost of service had been coming down, and finally what kind of a job did they think the company was doing, and did they favor public or private ownership.

Company executives believed they knew the answers to these and related questions but with logical reasoning and perfect candor admitted that they were not sure, so they rang the door bells of 4110 Buffalonians and asked some very direct questions and they received some very interesting answers. The number of people interviewed, according to expert research organizations, was wholly adequate to receive a clearly defined general opinion in this metropolitan area of 650,000. In order that the interviews be representative of the area as a whole, calls were made on people in five different income groups as follows:

A — $5,000 and over
B — $3,000 to $5,000
C — $2,000 to $3,000
D — $1,000 to $2,000
E — Under $1,000

It is interesting to note that this distribution checked within a percentage point or two in every classification with the index set up as ideal at the beginning of the survey (arrived at from the recent $7,000,000 study of buying habits made by the Government). 26.3 per cent of the interviews were with men; 73.7 per cent with women.

Now let's get back to our quiz. Mr. Utility Expert, our first group of questions will deal with service.

How Many of Your Customers Have Ever Called You For Service or Repair Work?

☐ 10% ☐ 25% ☐ 50% ☐ 75%

And before we tell you how far off you may be, how well would you say your organization handled these requests by prompt, efficient, and courteous service?

☐ 25% efficient ☐ 50% ☐ 75% ☐ over 90%

And now one more:

Do Service Calls Come from All Income Groups and Nationalities in About the Same Ratio as the Percentage of Families in Each Group or Are They Confined to Certain Income Groups and Certain Nationalities?

☐ All Groups
☐ Certain Income Groups

Now let's see how well you did on the first group. *Here are the answers:*

Nearly *one* family in every three has at some time called for service or repair work.

The response of your service organization, according to 99 out of 100, was prompt, efficient, and courteous, and a cross check shows that service calls come from all income groups and nationalities in about the same ratio as the percentage in each group.

Well, for a starter you didn't do too badly, or did you? Now let's get a little tougher.

How Many Customers Have Made or Have Had Reason to Make A Complaint?

☐ 10% ☐ 25% ☐ 50% ☐ 75% ☐ 90%

What Do Customers Complain About?

☐ Cut-Out for Non-Payment
☐ Appliance Repairs
☐ Cost of Service

And, of course, These Complaints Have Been Well Handled?

Customers Satisfied

☐ 25% ☐ 50% ☐ 75% ☐ 100%

Customers Dissatisfied

☐ 25% ☐ 50% ☐ 75% ☐ 100%

During A 12 Month's Period, How Many Customers Have Come in Contact with Your Various Services?

☐ 15% ☐ 25% ☐ 50% ☐ 75% ☐ 85%

Now let's look at the answers and see how well you were able to guess.

In the Buffalo survey more than 90 per cent of the customers state they have no reason to complain. More than half of the complaints were about the cost of service and nearly one-half of the complainants state they were not satisfied with the way in which their complaints were handled.

To summarize the service question group, Buffalo Niagara Electric Corporation learned that:

1. There apparently is no vital servicing problem.
2. The complaint picture is not so sweet, for while only 10% of the customers have ever felt the need to complain, half of those who actually placed a complaint felt that the company mishandled it.
3. One-half of the reasons for complaining had to do with the cost of service.
4. Less than 15% of this utility's customers were conscious of coming into contact during the previous twelve months with any of the company's varied services. 80% had no suggestions to make for improving service and 93% had a definitely favorable attitude toward the company.

Now if you are still willing to try again, let's talk about bills.

WHAT PERCENTAGE OF CUSTOMERS SAY THEY UNDERSTAND THEIR ELECTRIC BILLS?

☐ 10% ☐ 30% ☐ 50%
☐ 75% ☐ 90%

DO CUSTOMERS KNOW OFFHAND HOW MUCH THEY PAY EACH MONTH FOR ELECTRICITY?

☐ % Know Exact Amount

DO CUSTOMERS THINK THEIR ELECTRIC BILLS REASONABLE?

☐ % Reasonable
☐ % Unreasonable

Now let's see how well we did on the third group. Only 10 per cent of your customers, if the Buffalo survey is indicative of conditions generally in the industry, will admit that they do *not* understand their bill; yet less than 3 per cent know the exact amount they pay, and apparently most people do not worry about their bills being too high, for 61.8 per cent believe their bills are reasonable. As a little side question which we should like to toss your way and which we believe the odds are against you to answer correctly—

IN GUESSING THE EXACT AMOUNT OF THEIR BILLS, HOW MANY CUSTOMERS GUESSED LOW — HOW MANY HIGH?

Sorry, Mr. Utility Expert, but you lost out on that one, we believe, for when the customers' answer to this question was checked against actual bills, 60 per cent guessed low; 37 per cent guessed high, and 3 per cent were on the nose.

You may argue possibly (especially if you muffed a few of the answers) that conditions are different in your territory; that your operation is different; that your customers have certain peculiarities which marked them apart from the general run of utility customers and as a result a set of different answers would appear if you were to survey your customers. Without conceding these points let us move on to definitely common ground where the entire industry can ask the following questions without any doubts or qualifications.

HOW MANY PEOPLE REALIZE THAT THE COST OF ELECTRICITY HAS COME CONSISTENTLY DOWN?

In spite of all the educational effort to date (and Buffalo Niagara Electric Corporation has consistently told the story) only *one* person in four knows that the cost of electricity has come down while the cost of living has gone up.

DO CUSTOMERS FAVOR GOVERNMENT OR PRIVATE OWNERSHIP?

Out of every thirty persons surveyed, six think the electric company should be owned by some branch of the Government; ten favor private ownership and, most important, fourteen are indifferent or have no opinion.

Those who favor private ownership give as their strongest reason "satisfied the way it is" (33.8 per cent)—a passive condition subject to change.

Those who favor Government ownership are not passive in their reasoning, for 38 per cent have been influenced by low rate propaganda and say "rates would be lower."

Before we close this quiz session, let us analyze the facts produced by the survey and see what is the No. 1 problem that besets the public utility industry. In one word, it is *"indifference."* There seems to be several logical reasons for this:

Two-thirds of a utility's customers have never called for the so-called special services; hence they have no reason to be impressed by them.

Most customers do not know what they pay for electricity.

Three out of four persons have not been sufficiently impressed by the story of consistently reduced rates to remember it.

While most people will concede the company is trying to do a good job, nearly one-half are completely indifferent as to whether the company is privately or Governmentally owned. Another group definitely want Government ownership, while over one-third of the remaining group, who believe in private ownership, have not strong or definite reasons why they want it.

There seems no need in a paper such as this to detail what must be done. Simply stated, the survey indicates two objectives to be attained:

1. *To turn passive customers into active friends.*
2. *To strengthen those activities which are now making friends.*

Like a thorough physical examination, in the hands of a competent physician, a survey such as undertaken brings with it a feeling of great relief, for at least you know where you stand. You know that your heart and lungs are in good shape, even though your nerves may be slightly upset—you haven't cancer—although you are not exactly a Joe Louis. But you do know what ails you and if you are the prudent adult you think you are you will take the symptoms seriously; you will watch your diet; you will be faithful to the prescribed medicine, and as a result you will regain a fuller measure of health than you have ever enjoyed. Best of all, however, is the consoling fact that now you know, where before you were not sure.

1941 EEI RATE BOOK

THE 1941 edition includes six pages of indices covering rate types, rate features and special provisions. Present practice at your fingertips, hours of needless research eliminated. Indices include such live subjects as Auxiliary Service, Breakdown Service, Gaseous Tube Lighting, Coal Clauses, Tax and Commodity Clauses, Power Factor Discounts and Penalties and KVA Rates.

The 1941 Rate Book includes residential, commercial and power rates effective in 4238 cities, towns or communities of the United States and Canada having an aggregate population of 68,088,473. This compares with a coverage of 2858 communities with a total population of 59,307,289 in the 1940 edition. The book contains 416 pages, overall size 8½ x 11½ inches, packed with reference data. Rates for municipal plants are not included.

The subscription price is $10.00 to members. (Non-member price is $25.00.)

EDISON ELECTRIC INSTITUTE
420 Lexington Ave., New York, N. Y.

McGraw prize paper

A New Method for the Uniform Rolling-In of Condenser Tubes

By Frank F. Fisher

WITH the ever-increasing size of modern generating units it becomes daily more evident that such units are only as good as their auxiliaries. It is, therefore, only fair that these also should have the same attention during erection as is bestowed upon the main units. This applies particularly to the making up of the great number of tube joints found in the modern condenser. The larger condensers may contain 10,000 or more tubes and consequently 20,000 or more joints, each of which constitutes a potential chance of leak. The differential pressure existing at these joints causes a leakage of circulating water through the defective ones. To prevent such occurrence it is common practice among the power plant operators to check the conductivity of the condensate daily in order that leakage may be detected at once and corrective measures applied.

There are a number of methods in use at the present time for making these joints water-tight. Perhaps the simplest of these is the one in which the tube itself is expanded into the tube sheet. As this type of construction is becoming more general in its application, this article is written to describe a technique used to produce uniform joints of maximum strength and stability.

To get the correct view of this problem a short discussion of tube expanding or tube rolling in general is in order. By the simplest definition tube rolling is the process of cold working the tube metal by means of a rotating expander until the tube is larger than the tube sheet hole. The net result of such tube rolling or expanding is that the tube and tube sheet are in a state similar to the condition existing in joints formed by the shrinking or pressing together of two pieces of material.

There are, of course, definite limits to the cold working of the metals constituting the joint proper. Overrolling causes an excessive hardening of the joint metals with a consequent tendency to joint failure and tube sheet deformation. Insufficient rolling fails to produce enough pressure between the tube and tube sheet to form a joint of the required tightness and stability. However, the proper amount of rolling imparted to the joint will insure a tight joint of maximum strength and stability and consequent trouble-free service. "Elongation" which is the axial movement of the unworked portion of the tube during the rolling-in operation, measured from the face of the tube sheet adjacent to the tube, and expressed in thousandths of an inch, is a measure of the amount of rolling imparted to the joint. See "Rolling-In of Boiler Tubes," by F. F. Fisher and E. T. Cope, ASME Trans. Vol. 57; FSP 57-7. This term will be used to express the degree of expansion of a tube in making a joint.

MR. FISHER

Mr. Fisher is the winner of the Third 1941 James H. McGraw Award.

Mr. Fisher joined the Detroit Edison Company in 1919. He was formerly connected with the American Condenser Corporation at Plattsburg, New York.

At present Mr. Fisher is General Foreman of Mechanical Erection in charge of installing mechanical equipment in power plants, heating plants and substations.

On small jobs the rolling of the condenser tubes by hand is common practice. Although the elongation to be used in many such cases is not known to the operator and is, therefore, mostly guesswork, uniformity of rolling can be obtained by using the "feel" of the expander, that is, the physical effort required to rotate the expander. Supplied with the correct elongation for the job, an erector equipped with good hand tools should be able to turn out a creditable job of tube rolling.

On the larger jobs, hand labor is too slow and the tube expanders are operated by means of power drives of various types. However, by this substitution the "feel" of the expander is lost and with it the ability to roll in a uniform manner and at a prescribed elongation. It has been found that, even with a correct start most of such rolling performed is done right up to the capacity of the machine before the "feel" becomes evident to the operator. In other words, most operators will finally use the full power of their machines regardless of their size and capacity. As the output of most machines exceeds the power required to roll the ordinary condenser tube, many tubes are overrolled and are thus apt to fail in service.

Another rolling method often used on condenser jobs is the so-called "Fixed Expander Method." In this method a positive stop is placed on the tapered mandrel of the expander in such a manner that the expander cannot roll the tube beyond a given inside diameter. This dimension is determined first, by obtaining the average tube-hole size of the tube sheet; second, by deducting from this twice the tube-wall thickness, and third, by adding to this an arbitrary allowance designed to obtain the desired degree of expansion. This allowance generally varies from .006 to .014. In addition, this allowance must of necessity also compensate for any variation in

hardness of tube or tube sheet metal, tube wall thickness, and tube hole sizes. The last especially may be of considerable magnitude. This rolling method would be the ideal method provided the correct elongation were used and the variations were eliminated. This, of course, cannot be expected in a commercial condenser so that uniform rolling is hardly feasible with this method.

On a new condenser serving a 75,000-kw turbine, which was to be equipped with 11,000 ¾ inch 18 B.W.G. tubes rolled in at both ends, the condenser engineer requested that, if possible, the hardness of the rolled joint be uniform and below 90 Rockwell "E," in order to insure that uniformly good joints be obtained. As shown in the previous discussion of tube rolling, this was not feasible with any method in use up to that time so that it became necessary to devise other means to accomplish this purpose.

The solution of this problem was obtained by the cooperation of the condenser engineer and the writer and is described herein. In a sense it is merely an up-to-date version of the old "feel" rolling technique.

Uniform rolling may be broadly defined as the technique that, for a given elongation, produces practically identical working of the metals in every individual joint. From experience with boiler tubes, it has long been known that the elongation is an indication of the holding strength and the work performed on a joint and, thus, also of the force required to do the work. Conversely, by measuring and controlling the force applied to the rolling of each joint uniform rolling may be obtained.

The holding strengths of tube samples rolled to elongations corresponding to various joint conditions, were determined in a testing machine, which indicated that an elongation of .010 inch and a hardness of 85-90 Rockwell "E" would yield satisfactory holding strength in the joint and not exceed established hardness limits.

The next step was to measure the power required to expand the tube to this elongation. For this purpose an ammeter was put into the power circuit of the ¼ inch Little Giant Universal Screw Driver used to drive the expander. The power required proved to be 1.6 amperes at 58 volts, the reduced voltage being better adapted to the operation of the expander by reducing the speed. Other samples were then rolled at 1.6 amperes and the elongation measured. This proved to be about .010 inch as was expected.

All that was then left to do was to introduce the automatic "feel" into the circuit. This consists of an ordinary current relay set to open at 1.6 amperes and thus to prevent any overrolling. After trying out and checking this combination, the equipment was transferred to the condenser and put into operation. Before releasing the equipment for actual service it was tested on several tubes in the condenser by rolling right up to the relay opening and checking the elongation obtained. The resultant elongation varies between .009 inch and .011 inch, which was sufficiently accurate for the purpose.

The hydro-static test disclosed that of the 22,000 joints in this condenser, 17 needed re-rolling, an indication of good work, but of more importance is the fact that all the tubes were rolled uniformly and that good condition of every joint is assured. The Little Giant Screw Driver was chosen for this work on account of its light weight and ease of handling. It is equipped with a reversing attachment and normally drives the expander in the reverse. When the expander is entered into the tube hole, pressure is applied which causes a change in rotation and thus rolls the tube. After rolling is finished, which is indicated by the opening of the current transformer, a pull reverses the machine and backs the expander from the tube joint. To perform this operation smoothly and without stalling of the motor some experimenting and practicing will be necessary.

A stop on the expander mandrel allowing a 3/16 inch clearance over the average mandrel travel was found to be of great benefit. Variations from this clearance found at any of the joints correspond closely to the variations of their respective tube hole sizes. Any joint that does not finish-roll within this clearance requires special attention and should be marked and investigated.

If a sample joint is rolled to a fixed stop clearance it may be used as a gauge to position the stops on other expanders. The mandrel stop is also valuable as a check on the condition of the expanders. Checked against the gauge sample, any change from the original stop clearance is indicative of wear of some expander part.

It is expected, that with a re-design of the expanders, this method may be simplified still more.

Looking Forward

(*Continued from page* 370)

reasonable repair service, even for the appliances we ourselves do not repair for the customer? Or is our customer group charged high fees for slow service and unreliable repairs?

Do we apply the experimental technique to new ideas that show promise? Or do we arbitrarily master-mind, secure in the knowledge that we know all the answers? Do we give the new idea the benefit of a small scale test before committing ourselves to a decision of yea or nay? Or do we dismiss the idea with, "I don't like it."

Is management open-minded enough to use, or at least try, new techniques—the techniques of democratic supervision and the experimental attitude? Is personnel interested enough to continue to think originally and continue to make suggestions in spite of discouragement of new ideas by management? Are both management and personnel willing to give up easy tradition for harder exploration and experiment? Or is youth told his idea is too risky without benefit of a small scale try-out of new ideas?

Because public utilities are intrinsically monopolistic, both economically and practically, upon their operators are imposed responsibilities and obligations to customers beyond the responsibilities and obligations of competitive businesses. And these are not ordinary responsibilities and obligations. This exclusive franchise carries the implication of the highest ethical standards in the conduct of the business. There should be no failure to deliver service of the highest quality consistent with collectible costs.

Rates should be as low as possible consistent with such service, and increasingly scientific operation and growing volume of business should be pursued to attain lower rates. No discrimination, favors, or advantages should be shown to individuals or groups of customers. It is, of course, incumbent upon a utility to take care of the small user who may not carry his full share of the cost of his service but who is dependent upon the company, and who contributes to the common good of the community. There should be no catering to, or tribute to, prestige and power of any ilk. There should be reasonable and fair-minded co-operation with other interests of the community.

Further, because of this exclusive

(*Continued on page* 386)

U. S. Census Dramatizes Extraordinary Progress in Rural Electrification

AGRICULTURAL data just released by the U. S. Census Bureau dramatize the extraordinary progress in rural electrification accomplished during the ten-year period covered by the Census. Five major contributions of modern industry to farm comfort and efficiency are automobiles, electric service, telephones, trucks and tractors. The 1940 Census of Agriculture shows that of these contributions to farm life electrification ranks second as a farm facility and is exceeded only by the number of farms having automobiles.

At the time of the 1930 Census, farms having electric service were exceeded by those having automobiles and telephones and were tied by those having tractors, with trucks a close runner-up. On April 1, 1940, the Census found that 3,542,036 farms, or 58.1%, had automobiles; 2,032,316 or 33.3% of farm dwellings had electricity; 1,526,954 or 25% had telephones; 1,409,697 or 23.1% had tractors and 944,184 or 15% had motor trucks. In the ten-year period the percentage of farms having automobiles remained static, there was a loss in the percentage of those having telephones, a slight gain in trucks, the greatest gain being in electric service. In 1930, 58% of farms had automobiles, 34% telephones, 13.5% tractors and electricity, and 13.4% trucks. Table I shows a summary of general farm facilities, telephones, roads and electricity along with several other general items such as the size of farms, color and tenure of operator. Table II compares the farm facilities for 1930 with 1940 by states.

Table III shows rank of farm facilities by preference or use.

In 1940 the saturation of electricity was first in the following eight states: New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, District of Columbia, Utah and California. First place in all other states went to automobiles. In 1930 only the District of Columbia gave electricity first position and three states gave telephones that distinction, and 45 placed automobiles first. In 1940 electricity runs second in 30 states compared with only 7 in 1930. In North and South Dakota only does electricity rank in last place, as compared with 14 states in 1930.

A disturbing picture presented by the Census, however, is the comparatively high number of farms with access to electric service connections that are not using electricity.

The Census of Agriculture for the first time enumerated the number of farms reporting an electric distribution line within ¼ mile of the dwelling and 2,780,207 or 45.6 % farms reported the availability of such service. Of these 1,853,249 or 30.4% of all farms in the United States were receiving power line service. In addition, 179,067 farms or 2.9% had their own individual home lighting plants. On April 1, 1940, it is estimated that about 1,450,000 farms were connected to lines of private companies, the balance being served by rural cooperatives and lines of municipal

Farm Facilities
(Including General Farm Statistics and Electrification)

Size of Farms, Color and Tenure of Operators and Farm Facility	*Total United States* On April 1st 1940	On April 1st 1930	Increase or Decrease for 10 Year Period	Percent of Total or (Saturation) 1940	1930
SIZE OF FARMS					
Under 3 Acres	35,977	43,007	— 7,030	0.6	0.7
3 to 9 Acres	470,425	315,497	+154,928	7.7	5.0
10 to 19 Acres	559,254	559,617	— 363	9.2	8.9
20 to 49 Acres	1,221,006	1,440,388	—219,382	20.0	22.9
50 to 99 Acres	1,291,048	1,374,965	— 83,917	21.2	21.9
100 to 174 Acres	1,278,617	1,342,927	— 64,310	21.0	21.3
175 to 259 Acres	517,460	520,593	— 3,133	8.5	8.3
260 to 499 Acres	458,787	451,338	+ 7,449	7.5	7.2
500 Acres and Over	264,225	240,316	+ 23,909	4.3	3.8
Total All Farms	6,096,799	6,288,648	—191,849	100.0	100.0
COLOR OF OPERATOR					
White	5,377,728	5,372,578	+ 5,150	88.2	85.4
Non-White	719,071	916,070	—196,999	11.8	14.6
TENURE OF OPERATOR					
Full Owner	3,084,138	2,911,644	+172,494	50.6	46.3
Part Owner	615,039	656,750	— 41,711	10.1	10.4
Managers	36,351	55,889	— 19,538	0.6	0.9
All Tenants	2,361,271	2,664,365	—303,094	38.7	42.4
(Croppers)	(541,291)	(776,278)	(—234,987)	(8.9)	(12.3)
GENERAL FARM FACILITIES					
Automobiles (Farms having)	3,542,036	3,650,003	—107,967	58.1	58.0
Trucks (Farms having)	944,184	845,335	+ 98,849	15.5	13.4
Tractors (Farms having)	1,409,697	851,457	+558,240	23.1	13.5
Telephones (Farms having)	1,526,954	2,139,194	—612,240	25.0	34.0
ROADS (FARMS LOCATED ON)					
Hard-Surfaced Roads	1,146,936	594,182	+552,754	18.8	9.4
Gravel, shell, shale, etc.	1,731,477	1,435,644	+295,833	28.4	22.8
Total Surfaced Roads	2,878,413	2,029,826	+848,587	47.2	32.2
Improved Dirt Roads	1,528,597	1,638,954	—110,357	25.1	26.1
Unimproved Roads	1,442,678	2,279,989	—837,311	23.7	36.3
Other	247,111	339,879	— 92,768	4.0	5.4
ELECTRICITY (FARMS REPORTING)					
Electric distribution line within ¼ mile of dwelling	(2,780,207)			(45.6)	
Dwelling Lighted by:					
Current from Power Line	1,853,249	596,014	+1,257,235	30.4	9.5
Current from Home Plant	179,067	249,342	— 70,275	2.9	4.0
Total Lighted by Electricity	2,032,316	845,356	+1,186,960	33.3	13.5

SOURCE: U. S. Bureau of the Census (1940 Agriculture).

TABLE II—COMPARATIVE STATISTICS COVERING MAJOR FARM FACILITIES ON APRIL 1ST OF 1940 AND 1930

Source: U. S. Census of Agriculture

States	Number of Farms		Farms Having: Electric Lighted Dwellings		Telephones		Automobiles		Motor Trucks		Tractors		Farms Located On Surfaced Roads	
	1940	1930	1940	1930	1940	1930	1940	1930	1940	1930	1940	1930	1940	1930
Total United States	6,096,799	6,288,648	2,032,316	845,356	1,526,954	2,139,194	3,542,036	3,650,003	944,184	845,335	1,409,697	851,457	2,878,413	2,029,826
Maine	38,980	39,006	21,124	12,920	17,105	22,189	22,701	23,015	11,698	9,879	7,516	3,214	21,545	16,182
New Hampshire	16,554	14,906	11,184	6,160	8,528	9,313	10,801	9,288	5,489	4,051	2,850	1,013	10,216	5,852
Vermont	23,582	24,898	12,873	7,565	11,052	15,093	15,128	15,825	5,451	4,625	3,394	2,342	11,278	10,687
Massachusetts	31,897	25,598	26,648	16,037	17,066	16,581	19,743	14,737	9,934	7,982	6,550	3,563	24,218	14,557
Rhode Island	3,014	3,322	2,511	1,910	1,502	1,742	2,139	2,055	1,453	1,386	870	516	2,113	1,680
Connecticut	21,163	17,195	17,494	9,063	13,066	11,366	14,219	10,646	8,645	5,425	4,826	2,463	15,927	6,936
New England	135,190	124,925	91,834	53,655	68,319	76,284	84,731	75,566	42,670	33,328	26,006	13,111	85,297	55,894
New York	153,238	159,806	106,804	55,019	59,526	78,185	113,913	115,010	48,522	54,084	53,230	37,790	105,903	74,673
New Jersey	25,835	25,378	21,695	13,441	9,359	10,373	18,514	17,782	13,590	12,504	10,839	7,241	18,124	15,518
Pennsylvania	169,027	172,419	98,937	45,638	54,472	73,321	124,784	121,292	38,981	43,168	50,968	31,688	90,120	53,572
Middle Atlantic	348,100	357,603	227,436	114,098	123,357	161,879	257,211	254,084	101,093	109,756	115,037	76,719	214,147	143,763
Ohio	233,783	219,296	143,436	56,740	88,888	121,214	188,863	172,078	31,872	36,693	83,265	50,693	198,780	155,258
Indiana	184,549	181,570	95,575	30,335	83,675	110,333	149,026	141,374	27,409	28,488	68,447	40,402	163,169	139,404
Illinois	213,439	214,497	87,611	34,231	105,683	147,672	176,138	170,606	39,970	38,877	110,489	66,172	146,416	68,690
Michigan	187,589	169,372	133,095	34,785	52,025	73,757	152,922	133,565	30,311	34,894	62,146	33,098	138,525	98,626
Wisconsin	186,735	181,767	95,158	46,565	72,436	107,486	157,087	152,485	47,523	50,108	76,847	48,630	141,487	103,877
East North Central	1,006,095	966,502	554,875	202,656	402,707	560,462	824,036	770,108	177,085	189,040	401,194	238,995	788,377	565,855
Minnesota	197,351	185,255	59,838	23,342	87,939	114,693	172,764	159,372	36,101	35,503	95,959	46,171	130,732	81,091
Iowa	213,318	214,928	86,786	46,042	142,091	180,876	192,456	193,810	24,947	31,874	117,932	63,166	121,863	57,358
Missouri	256,100	255,940	45,355	20,223	99,799	137,712	162,640	164,087	29,845	19,215	41,948	23,673	113,169	51,978
North Dakota	73,962	77,975	11,446	6,192	20,627	31,878	61,418	67,496	19,937	16,502	43,787	34,148	22,968	5,316
South Dakota	72,454	83,157	12,845	9,070	24,821	44,608	62,512	71,965	13,472	14,485	39,948	30,972	30,210	11,434
Nebraska	121,062	129,458	34,886	21,380	52,349	93,888	107,484	118,860	22,504	25,176	64,593	37,955	45,127	16,713
Kansas	156,327	166,042	41,549	20,720	79,666	120,890	130,231	145,224	39,623	32,009	83,775	59,075	67,955	21,187
West North Central	1,090,574	1,112,755	292,705	146,969	507,292	724,545	889,505	920,814	186,429	174,764	487,942	295,160	532,024	245,077
Delaware	8,994	9,707	3,699	1,561	2,216	2,420	6,835	7,498	2,215	2,781	2,330	1,447	4,753	3,765
Maryland	42,110	43,203	18,351	9,145	12,982	11,935	29,695	30,519	11,454	10,205	9,448	6,744	22,091	17,474
Dist. of Columbia	65	104	54	67	49	69	30	45	32	57	12	15	56	87
Virginia	174,885	170,610	44,348	13,009	26,228	30,418	75,273	80,296	20,818	17,964	10,808	9,142	69,643	48,671
West Virginia	99,282	82,641	26,735	5,330	20,308	28,117	34,698	33,434	11,485	6,936	3,437	2,641	32,182	14,875
North Carolina	278,276	279,708	71,196	15,006	12,111	19,852	118,074	125,196	19,279	17,613	11,983	11,034	58,194	83,061
South Carolina	137,558	157,931	28,764	6,067	4,267	6,357	58,807	59,029	7,392	6,575	4,285	3,229	25,610	38,267
Georgia	216,033	255,598	43,958	7,499	8,473	14,771	72,140	85,276	19,952	15,036	8,264	5,349	24,634	41,929
Florida	62,248	58,968	16,472	6,489	3,556	3,525	24,552	24,161	11,668	10,852	6,319	4,382	19,084	18,910
South Atlantic	1,019,451	1,058,468	253,577	64,173	90,190	117,484	420,094	445,454	104,295	88,019	56,886	43,983	256,247	267,039
Kentucky	252,894	246,499	42,288	10,691	39,851	61,631	88,979	82,034	17,830	6,740	11,246	6,951	109,586	77,753
Tennessee	247,617	245,657	35,725	10,010	8,254	45,205	76,800	84,087	17,727	8,563	10,987	6,556	55,598	81,223
Alabama	231,746	257,395	40,519	10,505	32,468	19,510	46,202	71,167	14,094	12,169	6,822	4,259	141,977	80,524
Mississippi	291,092	312,663	27,670	4,792	8,215	15,858	53,259	83,372	17,334	15,762	7,905	4,818	125,994	119,827
East South Central	1,023,349	1,062,214	146,202	35,998	88,788	142,204	287,240	320,640	66,985	43,234	36,940	22,584	433,155	339,127
Arkansas	216,674	242,334	23,435	5,121	11,375	25,048	45,865	63,890	18,441	10,526	9,415	4,263	58,407	43,771
Louisiana	150,007	161,445	17,187	4,174	4,991	6,106	32,039	41,453	15,663	8,769	6,937	3,810	65,987	56,007
Oklahoma	179,687	203,866	28,280	8,091	32,571	53,149	102,921	117,537	26,660	23,039	41,130	23,328	31,929	16,338
Texas	418,002	495,489	93,577	22,854	54,564	97,346	248,580	280,758	51,416	49,966	86,973	31,776	123,588	86,674
West South Central	964,370	1,103,134	162,479	40,240	103,501	181,647	429,405	503,548	112,180	92,300	143,455	63,177	279,911	202,790
Montana	41,823	47,495	11,688	3,547	6,986	9,697	30,358	34,477	18,332	13,783	19,902	17,093	13,219	5,813
Idaho	43,663	41,674	26,384	12,809	12,523	15,733	32,806	30,776	10,941	5,986	10,175	4,377	25,835	17,140
Wyoming	15,018	16,011	5,184	1,145	3,828	4,483	10,889	11,462	5,553	3,820	5,601	3,749	4,021	1,526
Colorado	51,436	59,956	19,735	9,393	16,795	23,877	40,878	45,546	15,119	16,052	19,063	12,029	20,606	15,440
New Mexico	34,105	31,404	6,554	1,691	2,287	2,879	13,760	14,091	6,368	5,024	4,983	2,227	6,864	4,205
Arizona	18,468	14,173	6,031	3,671	2,670	2,672	7,925	8,211	3,561	2,719	2,881	2,043	4,493	3,181
Utah	25,411	27,159	17,714	15,778	4,998	7,416	15,352	16,343	5,801	3,986	2,892	1,335	16,033	12,767
Nevada	3,573	3,442	1,812	1,139	1,201	1,460	2,352	2,397	1,408	1,118	680	318	1,097	870
Mountain	233,497	241,314	95,102	49,173	51,088	68,217	154,330	163,303	67,083	52,488	66,077	43,171	92,168	60,742
Washington	81,686	70,904	60,082	34,056	26,161	31,764	60,870	50,769	24,886	17,822	16,776	7,890	60,694	45,914
Oregon	61,829	55,153	38,010	18,397	20,950	26,557	48,602	41,511	14,904	9,110	15,450	9,157	45,901	36,085
California	132,658	135,676	110,014	85,941	44,621	48,171	106,012	104,206	46,574	35,674	44,934	37,510	90,432	67,540
Pacific	275,173	261,733	208,106	138,394	91,732	106,492	215,484	196,486	86,364	62,406	78,160	54,557	197,087	149,539

NOTE: A fundamental change in the economic situation is the large decrease in the number of tenant farms, especially those occupied by share croppers, which accounts for the three per cent decline in the United States grand total of farms during the decade. This parallels a similar decline in the number of farms occupied by Negroes who, as the Bureau of Agricultural Economics has repeatedly pointed out, have migrated to towns and gone on relief.

plants. Table IV shows by geographic divisions the number of farms reported by the Census to be within ¼ mile of a distribution line and the number and percentage connected or not connected.

In 30 states more farms are within ¼ mile of a distribution line than are located on a surfaced road.

Table IV, together with the accompanying map showing corresponding data by states is indicative of the difficulties encountered in the extension of lines to farm homes. For the country as a whole, 926,958 farm homes or 33.3% had electric service available but for various reasons were not availing themselves of this service. Information gathered by the Institute for the year 1936 indicated that at that time about 20% of farms were adjacent to power lines but were not taking service.

Rank of States on the Matter of Electrification Materially Changes in the 10-Year Period 1930-1940

The 1930 Census of Agriculture indicated there were only seven states in which farm electrification exceeded 50%. The 1940 Census shows that 20 states now have in excess of 50% of the farms electrified. The State of New Jersey with 84% of its farms electrified heads the list, followed by Massachusetss, Rhode Island, District of Columbia, California and Connecticut, in all of

TABLE III — RANK OF FARM FACILITIES BY PREFERENCE OR USE

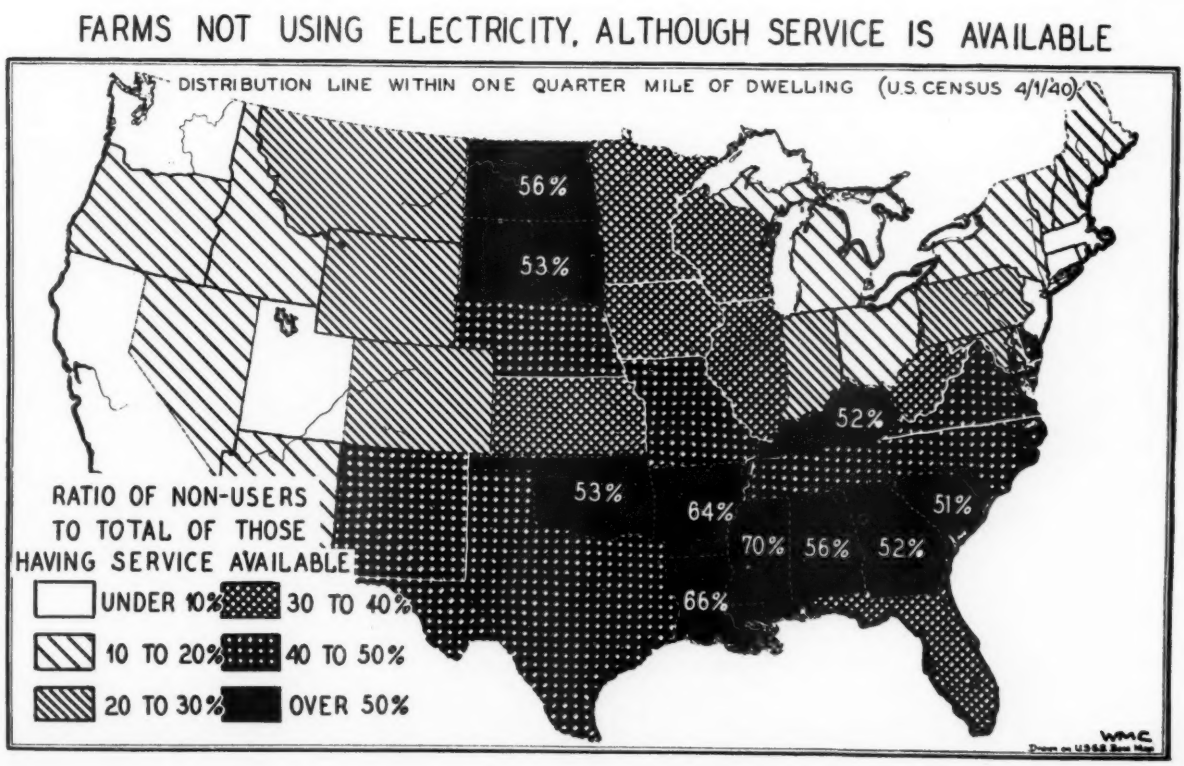
1940 and 1930

Number of States by Farm Facility Preference Groups

Preference Groups	Electricity		Telephones		Automobiles		Trucks		Tractors	
	1940	1930	1940	1930	1940	1930	1940	1930	1940	1930
1st Place	8	1	0	3	41	45	0	0	0	0
2nd Place	30	7	3	33	7	2	0	5	9	2
3rd Place	1	14	25	9	0	1	16	17	6	7
4th Place	8	13	12	3	1	1	16	21	13	12
5th Place	2	14	9	1	0	0	17	6	21	28

TABLE IV — ELECTRIC USAGE OF FARMS WITHIN ¼ MILE OF DISTRIBUTION LINES—AS OF APRIL 1, 1940

	Farms Within ¼ Mile of Distribution Line.	Number Connected	%	Number Not Connected	%
New England	100,618	88,951	88.4	11,667	11.6
Middle Atlantic	260,217	217,662	83.6	42,555	16.4
East North Central	687,976	527,516	76.7	160,460	23.3
West North Central	363,404	220,578	60.7	142,826	39.3
South Atlantic	438,307	241,138	55.0	197,169	45.0
East South Central	317,242	137,476	43.3	179,766	56.7
West South Central	295,903	136,637	46.2	159,266	53.8
Mountain	98,747	80,735	81.8	18,012	18.2
Pacific	217,793	202,556	93.0	15,237	7.0
Total United States	2,780,207	1,853,249	66.7	926,958	33.3



which electrification exceeds 80%. Table V shows the listing of states arranged by percent electrification as of April 1, 1940, the corresponding data and rank in 1930 and the numerical and percentage increase in farms for the ten-year period.

Table VI shows by states the number of farms as of April 1, 1940, the number within ¼ mile of distribution line, and the number lighted by electricity divided between those having some plants and power lines services by states.

Michigan increased the number of electrified farms by 98,310 during the ten-year period leading all states in the number of new connections and was followed by Ohio with 86,696, Texas with 70,723 and Indiana with 65,240. Michigan with a percentage gain of 282.6% also moved to eighth place with a saturation of 71.0% in 1940 compared with the 22nd position in 1930 and saturation of 20.5%. Mississippi, despite an increase from 4,792 electrified farms in 1930 to 27,870 in 1940 and a percentage increase of 477.7%, still holds 49th place with only 9.5% saturation as was the case in 1930 with 1.5%.

The Edison Electric Institute estimated that there were 1,988,361 electrified farms on December 31, 1940. This estimate adjusted to April 1, 1940, the date of the Census enumeration, would have been about 1,773,345, which is somewhat lower than the final Census figure of 1,853,249. The Institute is now revising its record on farm data to conform with the new governmental figures. The revised data will undoubtedly indicate that farm electrification as of September 30, 1941, will be somewhat over 2,100,000 farms or 34.4% connected to power lines, plus some 180,000 home lighting plants.

TABLE V—FARM DWELLINGS LIGHTED BY ELECTRICITY ON APRIL 1, 1940

COMPARED WITH CORRESPONDING DATA ON APRIL 1ST, 1930

States Arranged by Percent of Farms Electrified on April 1st, 1940

(Data cover individual Home Lighting Plants as well as Power Line Service)

(Source: U. S. Census of Agriculture, 1930 and 1940)

State	Number of Farms April 1st 1940	As of April 1st 1940			As of April 1st 1930			Increase in number Electrified 1940/1930	% Increase
		Rank	Number Electrified	% Electrified	Rank	Number Electrified	% Electrified		
New Jersey	25,835	1	21,695	84.0	6	13,441	53.0	+ 8,254	61.4
Massachusetts	31,897	2	26,648	83.5	3	16,037	62.6	+10,611	66.2
Rhode Island	3,014	3	2,511	83.3	5	1,910	57.5	+ 601	31.5
District of Columbia	65	4	54	83.0	1	67	64.4	- 13	-19.4
California	132,658	5	110,014	82.9	2	85,941	63.3	+24,073	28.0
Connecticut	21,163	6	17,494	82.7	7	9,063	52.7	+ 8,431	93.0
Washington	81,686	7	60,082	73.6	8	34,056	48.0	+26,026	76.4
Michigan	187,589	8	133,095	71.0	22	34,785	20.5	+98,310	282.6
Utah	25,411	9	17,714	69.7	4	15,778	58.1	+ 1,936	12.3
New York	153,238	10	106,804	69.7	10	55,019	34.4	+51,785	94.1
New Hampshire	16,554	11	11,184	67.6	9	6,160	41.3	+ 5,024	81.6
Oregon	61,829	12	38,010	61.5	11	18,397	33.4	+19,613	106.6
Ohio	233,783	13	143,436	61.4	17	56,740	25.9	+86,696	152.8
Idaho	43,663	14	26,384	60.4	14	12,809	30.7	+13,575	106.0
Pennsylvania	169,027	15	98,937	58.5	16	45,638	26.5	+53,299	116.8
Vermont	23,582	16	12,873	54.6	15	7,565	30.4	+ 5,308	70.2
Maine	38,980	17	21,124	54.2	12	12,920	33.1	+ 8,204	63.5
Indiana	184,549	18	95,575	51.8	23	30,335	16.7	+65,240	215.1
Wisconsin	186,735	19	95,158	51.0	19	46,565	25.6	+48,593	104.4
Nevada	3,573	20	1,812	50.7	13	1,139	33.1	+ 673	59.1
Maryland	42,110	21	18,351	43.6	21	9,145	21.2	+ 9,206	100.7
Delaware	6,994	22	3,699	41.1	26	1,561	16.1	+ 2,138	137.0
Illinois	213,439	23	87,611	41.0	26	34,231	16.0	+53,380	155.9
Iowa	213,318	24	86,786	40.7	20	46,042	21.4	+40,744	88.5
Colorado	51,436	25	19,735	38.4	27	9,393	15.7	+10,342	110.1
Wyoming	15,018	26	5,184	34.5	36	1,145	7.2	+ 4,039	352.8
Arizona	18,468	27	6,031	32.7	18	3,671	25.9	+ 2,360	64.3
Minnesota	197,351	28	59,838	30.3	28	23,342	12.6	+36,496	156.4
Nebraska	121,062	29	34,886	28.8	24	21,380	16.5	+13,506	63.2
Montana	41,823	30	11,688	27.9	35	3,547	7.5	+ 8,141	229.5
West Virginia	99,282	31	26,735	26.9	37	5,330	6.4	+21,405	401.6
Kansas	156,327	32	41,549	26.6	29	20,720	12.5	+20,829	100.5
Florida	62,248	33	16,472	26.5	30	6,489	11.0	+ 9,983	153.8
North Carolina	278,276	34	71,196	25.6	38	15,006	5.4	+56,190	374.5
Virginia	174,885	35	44,348	25.4	34	13,009	7.8	+31,339	240.9
Texas	418,002	36	93,577	22.4	40	22,854	4.6	+70,723	309.5
South Carolina	137,558	37	28,764	20.9	45	6,067	3.8	+22,697	374.1
Georgia	216,033	38	43,958	20.3	46	7,499	2.9	+36,459	486.2
New Mexico	34,105	39	6,554	19.3	39	1,691	5.4	+ 4,863	287.6
Missouri	256,100	40	45,355	17.7	32	20,223	7.9	+25,132	124.3
South Dakota	72,454	41	12,845	17.7	31	9,070	10.2	+ 3,775	41.6
Kentucky	252,894	42	42,288	16.7	41	10,691	4.3	+31,597	295.5
Tennessee	247,617	43	40,519	16.4	43	10,010	4.1	+30,509	304.8
Oklahoma	179,687	44	28,280	15.7	44	8,091	4.0	+20,189	249.5
North Dakota	73,962	45	11,446	15.5	33	6,192	7.9	+ 5,254	84.9
Alabama	231,746	46	35,725	15.4	42	10,505	4.1	+25,220	240.1
Louisiana	150,007	47	17,187	11.5	47	4,174	2.6	+13,013	311.8
Arkansas	216,674	48	23,435	10.8	48	5,121	3.1	+18,314	357.6
Mississippi	291,092	49	27,670	9.5	49	4,792	1.5	+22,878	477.4

TABLE VI—FARM ELECTRIFICATION DATA AS OF APRIL 1, 1940

(U. S. Census of Agriculture, 1940)

State	Number of Farms	Dwellings Within 1/4 Mile Distribution Line Number	Dwellings Within 1/4 Mile Distribution Line %	Dwellings Lighted by Electricity Total Number	Total %	Power Line Number	Power Line %	Home Plants Number	Home Plants %
Total United States	6,096,799	2,780,207	45.6	2,032,316	33.3	1,853,249	30.4	179,067	2.9
Maine	38,980	24,160	62.0	21,124	54.2	20,221	51.9	903	2.3
New Hampshire	16,554	12,374	74.7	11,184	67.6	10,845	65.5	339	2.1
Vermont	23,582	14,855	63.0	12,873	54.6	12,213	51.8	660	2.8
Massachusetts	31,897	28,043	87.9	26,648	83.5	26,220	82.2	420	1.3
Rhode Island	3,014	2,644	87.7	2,511	83.3	2,457	81.5	54	1.8
Connecticut	21,163	18,542	87.6	17,494	82.7	16,995	80.3	499	2.4
Total New England	135,190	100,618	74.4	91,834	67.9	88,951	65.8	2,883	2.1
New York	153,238	115,879	75.6	106,804	69.7	102,283	66.7	4,521	3.0
New Jersey	25,835	23,056	89.2	21,695	84.0	21,298	82.4	397	1.6
Pennsylvania	169,027	121,282	71.8	98,937	58.5	94,081	55.6	4,856	2.9
Total Middle Atlantic	348,100	260,217	74.8	227,436	65.3	217,662	62.5	9,774	2.8
Ohio	233,783	170,897	73.1	143,436	61.4	137,680	58.9	5,756	2.5
Indiana	184,549	123,662	67.0	95,575	51.8	91,127	49.4	4,448	2.4
Illinois	213,439	114,088	53.5	87,611	41.0	80,027	37.5	7,584	3.5
Michigan	187,589	153,042	81.6	133,095	71.0	131,126	69.9	1,969	1.1
Wisconsin	186,735	126,287	67.6	95,158	51.0	87,556	46.9	7,602	4.1
Total E No Central	1,006,095	687,976	68.4	554,875	55.1	527,516	52.4	27,359	2.7
Minnesota	197,351	80,220	40.6	59,838	30.3	50,075	25.4	9,763	4.9
Iowa	213,318	107,359	50.3	86,786	40.7	73,308	34.4	13,478	6.3
Missouri	256,100	74,035	28.9	45,355	17.7	39,204	15.3	6,151	2.4
North Dakota	73,962	7,310	9.9	11,448	15.5	3,218	4.4	8,228	11.1
South Dakota	72,454	8,444	11.7	12,845	17.7	3,981	5.5	8,864	12.2
Nebraska	121,062	40,969	33.8	34,886	28.8	22,832	18.9	12,054	9.9
Kansas	156,327	45,067	28.8	41,549	26.6	27,960	17.9	13,589	8.7
Total W No Central	1,090,574	363,404	33.3	292,705	26.8	220,578	20.2	72,127	6.6
Delaware	8,994	6,098	67.8	3,699	41.1	3,545	39.4	154	1.7
Maryland	42,110	23,700	56.3	18,351	43.8	17,117	40.8	1,234	3.0
District of Columbia	65	60	92.3	54	83.0	53	81.5	1	1.5
Virginia	174,885	77,255	44.2	44,348	25.4	42,144	24.1	2,204	1.3
West Virginia	99,282	36,958	37.2	26,735	26.9	25,199	25.4	1,536	1.5
North Carolina	278,276	124,017	44.6	71,196	25.6	67,627	24.3	3,569	1.3
South Carolina	135,558	56,731	41.2	28,764	20.9	27,568	20.0	1,196	0.9
Georgia	216,033	88,427	40.9	43,958	20.3	42,409	19.6	1,549	0.7
Florida	62,248	25,063	40.3	16,472	26.5	15,476	24.9	996	1.6
Total So Atlantic	1,019,451	438,307	43.0	253,577	24.9	241,138	23.7	12,439	1.2
Kentucky	252,894	79,740	31.5	42,288	16.7	38,607	15.3	3,681	1.4
Tennessee	247,617	74,276	30.0	40,519	16.4	38,884	15.7	1,635	0.7
Alabama	231,746	77,579	33.5	35,725	15.4	33,907	14.6	1,818	0.8
Mississippi	291,092	85,647	29.4	27,670	9.5	26,078	9.0	1,592	0.5
Total E So Central	1,023,349	317,242	31.0	146,202	14.3	137,476	13.4	8,726	0.9
Arkansas	216,674	58,732	27.1	23,435	10.8	21,303	9.8	2,132	1.0
Louisiana	150,007	46,694	31.1	17,187	11.5	16,058	10.7	1,129	0.8
Oklahoma	179,687	43,128	24.0	28,280	15.7	20,149	11.2	8,131	4.5
Texas	418,002	147,349	35.3	93,577	22.4	79,127	18.9	14,450	3.5
Total West So Central	964,370	295,903	30.7	162,479	16.8	136,637	14.2	25,842	2.7
Montana	41,823	10,614	25.4	11,688	27.9	7,947	19.0	3,741	8.9
Idaho	43,663	28,931	66.3	26,384	60.4	25,439	58.3	945	2.1
Wyoming	15,018	4,655	31.0	5,184	34.5	3,474	23.1	1,710	11.4
Colorado	51,436	20,046	39.0	19,735	38.4	14,823	28.8	4,912	9.6
New Mexico	34,105	7,644	22.4	6,554	19.2	4,479	13.1	2,075	6.1
Arizona	18,468	6,577	35.6	6,031	32.7	5,607	30.4	424	2.3
Utah	25,411	18,510	72.8	17,714	69.7	17,411	68.5	303	1.2
Nevada	3,573	1,770	49.5	1,812	50.7	1,555	43.5	257	7.2
Total Mountain	233,497	98,747	42.3	95,102	40.7	80,735	34.6	14,367	6.1
Washington	81,686	62,843	76.9	60,082	73.6	58,283	71.4	1,799	2.2
Oregon	61,829	41,245	66.7	38,010	61.5	36,369	58.8	1,641	2.7
California	132,658	113,705	85.7	110,014	82.9	107,904	81.3	2,110	1.6
Total Pacific	276,173	217,793	78.9	208,106	75.4	202,556	73.3	5,550	2.0

EDITOR'S NOTE: Information contained in the above table and all other tables in this article has been or soon will be made available by the Census Bureau for each county in the several states. Information on the number and acreage of farms by size, color and tenure of operator, together with crop statistics, are contained in individual state reports known as Final First Series, and are available for all states from the Superintendent of Documents, Washington, D. C., at prices ranging from 10c to 35c. General farm facility statistics including electrification is shown by counties in the Second Series Reports and are *now* available for the following states: Michigan, Rhode Island, Vermont, Delaware, Iowa, Minnesota, Ohio, Maryland, Nevada, New Hampshire, Connecticut and Nebraska.

The price of the Second Series is essentially the same as those mentioned above. In ordering these reports from the Superintendent of Documents, be sure to indicate that it is the Agricultural census data you are seeking, since individual state reports are also being issued covering population, housing, etc.

EEI Will Cooperate with National Safety Council's Emergency Safety Program

REPRESENTATIVES of the Accident Prevention Committee of the Edison Electric Institute who attended the Emergency Safety Conference, called recently by the National Safety Council, expressed complete approval of the aims and purposes of the Conference, and will initiate at the Committee's meeting in New York next month plans for cooperation in carrying through the Conference's broad objectives.

The Conference was held at New York September 9 and attended by representatives of more than 100 national organizations, representing industry, transportation, home and farms, and child safety. The EEI was represented by George S. Diehl, Chairman of the Accident Prevention Committee and A. B. Campbell, secretary of the committee.

The major purpose of the Conference was to discuss measures for meeting the present accident emergency situation and agree on definite programs of action which could be undertaken by the interested organizations, jointly and severally. The outstanding points brought out at the Conference were (1) the large increase in the gross number of accidents, (2) the large proportion (roughly two-thirds) of off-the-job accidents, (3) the relatively large proportion of traffic accidents in the total, and (4) the enlistment of all the trade and other organizations represented at the conference to promote the National Safety Council Campaign to reduce the number of accidents.

Industrial accident deaths have increased 7 per cent so far in 1941, traffic deaths are up 17 per cent, all accidental deaths, 3 per cent. Probable accident toll for 1941 was estimated at 100,000 deaths by President John Stilwell of the National Safety Council, who stated that conditions arising directly from defense activities are responsible for the rising number of accidental deaths.

"When we think of the thousands of new workers added to industry almost overnight, and of the enormous increases in highway travel due to defense activities, it is apparent that emergency measures must be taken to meet an emergency situation," Mr. Stilwell said.

"We cannot hope to stop all these accidents. But all of us, working together, can prevent many of them if we try hard enough. This is proved by the experience of industries, fleets, cities and states which, through energetic and persistent safety efforts, have cut their death and accident rates far below average."

The Industrial Committee, one of five committees appointed at the Conference, presented, in a report adopted by the Conference, the following statement of principles:

Statement of Principles

"The Industrial Safety Committee is in full accord with the aims and purposes of the Emergency Safety Conference, and is convinced that the human and economic losses resulting from preventable accidents can be reduced to a minimum in all industrial establishments by acceptance of the principles, and by intensive application of the methods, which have proved successful in the accident prevention programs of hundreds of progressive companies.

"The committee, therefore, recommends and urges, as vital to the success of the National Emergency Safety Campaign:

1. That executives of every industrial organization recognize the prime importance of aggressive management leadership in accident prevention. This leadership must be given wholeheartedly and continuously if safety is to receive adequate attention during the rush of defense production.

2. That organizations of employees continuously emphasize to their members the possible serious consequences of accidents, both financial and otherwise, and that they cooperate with industrial management in formulating and applying sound and reasonable procedures for safeguarding employees.

3. That managements recognize the high cost of accidents, both in time and money, and the consequent importance of judicious expenditures for correcting accident hazards, safeguarding equipment, and educating employees. Money spent on safety is really an investment in economy of operation.

4. That management take positive steps to meet the special difficulties now encountered in maintaining a safe working place. Over-crowding and confusion resulting from expanded operations are a constant accident threat.

5. That industry recognize the key position of the supervisor and foreman in training workers for safety and in maintaining safe standards of operation. In these times of industrial stress, it should be realized that demands on supervisors to meet production schedules must not be so extreme as to make safe operation impossible.

6. That both employer and employee refuse to accept the idea that the defense program in industry requires chance-taking. Plants where there is a disposition to speed up operations regardless of possible serious losses of men and material through accidents, are not in line with the safety principles laid down in the President's Proclamation.

7. That injuries to workmen in off-the-job accidents be recognized as losses to industry of equal seriousness to injuries occurring on the job. The defense program is retarded no less when a skilled mechanic is disabled in a home accident or a traffic accident than when he is injured at work.

"It is the recommendation of this committee that the principles and program suggested in this report be placed immediately in the hands of industrial managements and industrial employees, through such means as: publications, convention addresses, safety committees, letters, personal safety service, pamphlets, posters, and other means. Among the groups which should be able to participate in the campaign are: trade associations, labor organizations, departments of labor and other government agencies, insurance companies and professional societies.

"This statment of safety principles is formulated in the belief that our defense efforts can be successful only through efficient production, and that safety and efficiency go hand in hand. Industry pledges its unceasing efforts to conserve men and materials through accident prevention, as a major part of its responsibility in the defense program."

Rural Electrification in the United States

PART I—THE PIONEER PERIOD, 1906-1923

By Royden Stewart

This series of articles is published through the courtesy of Public Utilities Fortnightly, which has published a portion of the material contained in the series. Mr. Stewart was formerly on the staff of the Edison Electric Institute and is now with the Westinghouse Electric and Manufacturing Company.

The extension of central station electric service to American farms was under way at least 35 years ago, and rural electrification Administration, has allotted more than $388,000,- of farm organizations and the utility industry since 1923. By the end of 1935, 789,000 farms were receiving service from utility lines. Expansion has been much more rapid in the past five years. The Federal Government, through the Rural Electrification Administration, has allotted more than $388,000,-000[1] in loans to finance the construction of rural electric systems and has appropriated over $15,000,000 more for REA administrative expenses. The lines built by the borrowing agencies, most of which are cooperative associations of farmers, are now serving about 607,000 farmers. During the same period the privately owned utility companies have nearly doubled the number of their farm customers, so that they now serve approximately 1,500,000. The total of 2,100,000 is slightly over one-third of the number of farms in the United States.

Perhaps inevitably, the Government activity has brought rural electrification into the realm of political discussion and political considerations have obscured for many observers the important economic technical and social problems that are involved. This account of the beginnings and development of rural electric service in the United States is presented in the hope that, by providing historical perspective, it will make possible a more realistic view of the whole subject.

[1] As of August 30, 1941. REA release No. 333, August 30, gave a cumulative total of $388,827,121.

As a matter of historical interest, an electrical trade publication has noted[2] that "the first serious experimental use of electric power was for plowing, and the first real installation in regular operation was for handling beets in a sugar factory." These applications were made in 1878, one year before Edison's development of a practical incandescent lamp and four years before the establishment of the first central station; thus, it seems evident that the possibilities of electric power in farm work had earliest consideration.

Significantly, of these two "first" farm uses, the survivor is the electrically powered hoist, the vision of a practical electric plow having been shattered long ago by the development of the internal combustion engine for vehicle propulsion. Today the function of electricity on the farm remains an auxiliary one. It can make life easier in the farm home, render important help in the irksome farm chores and improve the efficiency and economy of the processing and handling of farm products. It has revolutionized dairying and poultry raising where these are carried on as businesses on a considerable scale. But the actual production of field crops has not been electrically powered. Except for the pumping of water for irrigation, agriculture in its primary meaning—preparing the soil, planting, growing, cultivating and harvesting—remains virtually unaffected. This is an important reservation that is usually overlooked when "the electrification of agriculture" is discussed.

There is evidence of further early experiments with electric power on the farm in the construction of small individual generating plants which began soon after the introduction in the 1880's of central station service in urban communities. Nearby water power operated these first farm plants, the forerunners of the small individual plants operated later in considerable number by internal combustion engines. By the late 90's farmers in the irrigated areas of the Far West were using electrically driven pumps, also powered from individual plants, to bring water to their fields.

Central Station Service Appears

About this time, it seems safe to assume, a few farms were receiving central station electric service. Although the infant electric light and power industry had a total of only 25,000 customers in 1890 and 350,000 at the turn of the century, the location and size of some of the communities served suggest that some of the homes connected during these first two decades were farmhouses. This is confirmed by the recollection of persons living in such communities at the time, who state further that barns and farm outbuildings were lighted and small motors operated by energy from the distribution lines.

In a recent letter to the author, Mr. W. G. Vincent, vice-president and executive engineer of the Pacific Gas and Electric Company tells of what was perhaps the earliest success of a utility company in taking electricity to the farmer:

"The first farm pumping installations occurred in 1898 on what is now the P. G. & E. system. One of the installations in 1898 was when the transmission line from the Folsom hydro plant to the City of Sacramento was tapped to supply service for a farm pumping plant at Mayhews, near Sacramento. The installation consisted of two electric motors and transformers which replaced gas engines. When it was proposed to tap the line to serve this farm there was doubt expressed as to the practicability of taking energy from the transmission lines running between the generating and receiving stations for the reason that it might not be possible to control the current. However, the installation was made and nothing happened.

"Also in 1898, a farmer near Yuba City was persuaded that a small electric motor would be more efficient than a gas engine. The town of Marysville (Yuba City adjoins it) was supplied over an 18 mile transmission line from a hydro plant in Browns Valley. The power company built a line, two miles in length, from Marysville to serve this farm with electric lights and for irrigation and other power purposes.

"A 5 horsepower motor was installed on a line shaft which ran a raisin stemmer, cider press, force pump to force

[2] *Electrical World*, Oct. 13, 1906.

water into an elevated tank for domestic use or to furnish power for two walking beams, each of which operated two plunger pumps, each in a shallow well, for irrigation of 25 acres of nursery stock. Service was connected to the farm on April 28,1898.

"In 1899 at Lindsay in the San Joaquin Valley, Mr. A. G. Wishon made several agricultural pumping installations. He wanted to sell electricity on a horsepower year basis but the farmers wanted to pay only when they used it. Mr. Wishon went to San Francisco and borrowed $25,000 and invested the entire amount in motors and transformers. He went back to Lindsay and offered the first man he met his motors and transformers on the basis of nothing down 6 per cent interest, the principal payable one-fifth annually. Within two days he had sold all of his motors and transformers and had accomplished what he had set out to do, that is, to obtain needed customers.

"Lines were extended into the adjacent area to serve additional farms.

"The company was also a pioneer in calling attention to the use of electricity in farming operations. To draw the attention of the farming population to the availability of electric power for farm purposes the company constructed a traveling exhibit in the form of a railroad car supplied by the Northern Electric and run over its lines. Its interior was fitted up with working models of electic motors and pumps and other devices for the use of electricity on the farm. This demonstration car traveled altogether upwards of 500 miles and entertained 6000 persons."

Early Lines in Oregon

In July of 1906 the predecessor of the Pacific Power and Light Company built a distribution line having the sole purpose of serving farmers. About one mile long, it had five farm customers living near the town of Hood River, Ore. By the spring of 1907 ten additional miles had been built on roads radiating from the town, and ten more were added in the next three years. Irrigation, always an important factor in agriculture in the Far West, provided an immediate use for electricity on a considerable scale, and the Hood River installation was quickly followed by others in the region. As late as 1928 Hood River Valley boasted that it was the country's most completely electrified rural district.

Lighting Was a Secondary Consideration

In the cities the initial purpose of bringing the wires into homes and places of business was to obtain better light. But the catalyst in the case of the Western farmers was the more immediately economic need to irrigate land—plus, some records say, the adaptability of the electric motor as a driving agent for apple graders. At any rate, lighting apparently was a secondary consideration to the Western farmer, though once the power was available electric bulbs naturally began to appear in farm buildings.

The comparative slowness of the electric lines in reaching farms is easily understandable. The utility companies, like any new business, served first the market that was immediately available and promised the surest return: the thickly populated areas. Rural service posed problems that the industry was not yet prepared to meet. In 1900 generating and distributing equipment was still largely experimental, the electrification of industry had only begun and the business of electric supply was decidedly risky. (A question for heated debate at that time was whether or not an electric distribution system could be made profitable in a manufacturing town of 100,000 population, and as late as 1910 such direct applications of electricity as heating and cooking were looked at askance.) In 1902 the first Census Bureau count of electric customers showed 583,000 of all classifications and in 1907 the number was still less than 2,000,000—as compared to 30,000,000 in 1940. How many of the 2,000,000 were farmers cannot be known, for neither the Bureau nor the utility companies made any distinction in their records between urban and farm customers and there was no accepted definition of a farm; but the number of farm users cannot have been greater than a few thousands.

Technical and Financial Obstacles

Many utility managers of those early times saw the possibilities of farm service, but the technical and financial obstacles to extension of lines appeared insurmountable in most areas. In the Middle West and East, where there was no irrigation to serve as a basis of firm demand, building a rural line meant an investment in distribution equipment alone of $1,200 to $2,000 for a single mile, to serve perhaps two or three farmers, each of them having a few bulbs to light and possibly a small motor to turn a few hours a week. The managements could not justify this kind of expansion to their investors. They could only look forward hopefully to the day when a much greater development of generation, transmission and distribution facilities would make more extensions feasible and new farm uses for electricity would provide some hope for financial liquidation. Meanwhile they cooperated—often with too much optimism on both sides—with individual farmers and groups of farmers in financing and building extensions wherever they seemed feasible.

1910—Rural Lines Committee is Formed

The importance of these pioneering experiments, carried out in various sections of the country, was quickly recognized by the utility industry. At the 1910 convention of the National Electric Light Association, Herman Russell, of the Rochester (N. Y.) Railway and Light Company, reported that his company was successfully promoting the use of irrigation as "drouth insurance" for New York farmers and was finding farm business a desirable load-builder. Recounting the activities of other companies, mostly in the West, in developing this new type of business, he urged that the industry give it greater attention. "I look forward to a time not far distant when electric lines in the country will be as common as telephone and telegraph lines are today and the present enormous idle investment of our central-station companies will be employed in making our farms more productive and life more worth the living for both the farmer and the company—at good profit to each," he concluded. The delegates were impressed, and the newly organized commercial section of the association was made to include a Committee on Electricity in Rural Districts. The report of this committee, a document of 87 pages submitted and published in 1911, is probably the first systematic accumulation of data on farm electrification.

From the standpoint of the utility companies, the committee stated, farm business had the advantage of being largely off-peak, i.e., using electricity during the times of day and seasons of the year when the demand of urban customers was relatively low. But it pointed out also that the necessary investment in lines, transformers and other equipment frequently was out of proportion to the revenue that might be expected.

Thus it was in 1910. Today, the leveling up of usage "valleys" generally has virtually eliminated the advantage of off-

peak demand; but initial construction costs and the relatively higher maintenance expenses, as compared with urban distribution, remain the greatest barriers to the ideal objective of electricity in every farm.

Results of The First Survey

The 1910 committee had sent questionnaires on rural service to central station companies and electric railway companies (who were still important suppliers of energy to retail customers) throughout the United States, Canada and Mexico. Tabulation of the returns, admittedly incomplete, showed 44 districts, in 22 states, in which farms and small rural industries were receiving service. In six of these districts the lines were owned by the customer, in 20 by the company, in 12 jointly by company and customer; in two districts the ownership was "rebate" (customer paid for construction, was reimbursed in electric service); one was listed as "income basis" (unexplained), and three did not report ownership. Rates, for strictly agricultural use, ranged from 1½ cents to 15 cents a kwhr and the average monthly bills of individual farmers from $1.30 to $41.60. How nearly this report represents the true status of rural electric service in the United States in 1910 is highly uncertain, but no other record is to be had.

Three recommendations made by this pioneering committee and later adopted by the Association, are important to the record:

"1st. That the United States Department of Agriculture be urged to get out a bulletin on the use of electricity on the farm.

"2nd. That a set of resolutions, similar to those adopted by the National Gas and Gasoline Engine Trades Association, but adapted to the special needs of this Association as regards the use of electricity in rural districts, be prepared by a committee to be appointed by the chair, and that they be brought up for adoption by the Association; and that a committee be appointed to personally present an official copy of said resolutions to the Secretary of the Department of Agriculture at Washington, D. C.

"3rd. That an investigation of types of farming machinery now being manufactured be made, with a view to securing adaptations which may be necessary in their design to render them readily adaptable to motor drive."

The committee further reported that it had been in correspondence with 77 agricultural colleges and that a large majority had shown "considerable interest."

The household electric appliances already in use in the cities could also be used by the housewife on the electrified farm, the committee noted, and it listed 38 farm machines which might be motor-driven.

When the Association's committee called on Secretary of Agriculture Wilson—who "accorded a most courteous and attentive hearing for nearly an hour and then took the subject under advisement"—it added a fourth recommendation: that the Census Bureau be asked to secure data on the extent to which central station service was being used by farmers.

Development by 1912

The next year, 1912, the NELA committee found cause for gratification in the facts that several state electrical associations had in 1911 heard papers on farm electrification and that both technical and popular magazines had published "numerous articles" on the subject, some of them reprinted by newspapers.

The Pacific Power and Light Company was continuing its activities begun in 1906 with the building of the first Hood River lines and, the 1912 committee report said, was doing "an exceptional business in the sale of electric power for irrigation." The Southern California Edison Company was planning to tap its 10,000-volt line, reducing direct to 110-220 volts, in order to serve farms.

The 1912 report of the Census Bureau on central electric light and power stations included a section on electricity in agriculture, beginning: *"The use of electricity on the farm has been pursued and developed with extraordinary rapidity in recent years. The chief reasons are the extension of power transmission circuits from central stations in cities and the establishment of distribution networks in connection with hydroelectric enterprises, looking for patronage of every description."*

100 Farm Uses Cited

The Bureau report goes on to remark, "The variety of uses to which electricity can be put on the farm is surprising," and cites the 1912 report of the NELA committee, which enumerated 50 uses in the farmhouse itself, 30 applications for electric-motor drive to barn and field machinery and 20 uses in the dairy. This count did not include the applications in irrigation and in such rural industries as fruit-canning, digging sand and gravel, operating stone quarries, sawmills, creameries, gristmills, etc.

Of irrigation in the West the Bureau said: "The aggressive policy of certain central stations in building the necessary pole lines to reach such loads has resulted in many interesting and very profitable installations of motor-operated pumps."

Some Western Installations

M. A. Lunn, living near Denver, Colo., was successfully irrigating 80 acres of arid land with the aid of a 35-hp, 3-phase, 220-volt motor belted to a centrifugal pump. Power was obtained from a 13,000-volt line, the pressure being reduced to 220 volts at the pumphouse.

Probably Mr. Lunn's power was supplied by The Northern Colorado Power Company, which served a large territory just east of the foothills of the Rockies, between Denver and Cheyenne, Wyo., and was going thoroughly into the business of irrigation by electric power, one part of its work being to reach underflow by pumping. Its main transmission line used 44,000 volts, with branches at 13,200 volts, 6600 volts and 2300 volts, and the system then built (1912) reached 32 towns. Lines were run on wooden poles, 40 to the mile, with substations and switching stations about 20 miles apart on the main line, so arranged that any substation could be cut out without interrupting the service. The company made careful tests on 57 pumping plants in 1910. For an irrigation plant arranged to supply 160 acres, lifting through a 25-foot head, the company found the average investment required to be $7.45 per acre and the cost of operation varying from $1.75 to $2.25 per acre-foot (a foot of artificial rainfall per acre).

In the same year over 60 miles of secondary distribution lines were built through the rich farming lands of the Sacramento and San Joaquin valleys in California, by Western States Gas and Electricity Company. The system had a connected load of nearly 2000 hp and served about 700 ranchers. This network, built at a cost of $90,000, or $1,500 per mile, covered 80 square miles and extensions were planned to cover 2000 square miles. This shining example moved the Census Bureau to comment: "Irrigation plants operated by central station service are always ready for use, and are started and stopped with no more effort than is required for the throwing of a switch. Such power service is, of course, a great boon to the small farmer." Rates for electric service under this set-up were: first 1000 kwhr,

3 cents per kwhr; second 1000 kwhr, 2½ cents; third 1000 kwhr, 2 cents; fourth 1000 kwhr, 1½ cents. Within three months, in the summer and fall of 1912, 1500 hp, mostly in small motors driving irrigating plants, had been connected to the lines.

The 1913 report of the NELA Committee on Electricity on the Farm (successor to the Committee on Electricity in Rural Districts) stated that the use of electricity for agricultural purposes was most extensive in the irrigating states of Washington, Oregon, California and Nevada.

Progress in The Middle West

Although no such rapid and large-scale development was possible in the Middle West and East, progress was being made in these sections also. At the 1911 meeting of the Illinois State Electrical Association, E. L. Brown, of Elmwood, described his local system comprising 30 miles of transmission lines connecting eight small towns and supplying about 50 farms, and R. H. Abbott, of Petersburg, told of service to farmers along the route of a 16,500-volt, single-phase transmission line, with step-down transformers lowering to 2400 volts for the primary distribution. All transformers, poles, lines, arresters, etc., were owned by the customers, who also furnished free the right-of-way for the "high" line in return for being guaranteed service at the town rates, with a minimum bill of $2 per month. Many of the farmers immediately bought such electrical equipment as pumps, motors, fans, irons, bathroom heaters and other appliances. Three farmers, near Farmington, desiring service from a transmission line, hauled and erected the necessary poles, in addition to purchasing transformers; iron wire was used for the secondary lines.

Experimentation with less expensive materials and equipment was going forward. One man reported at the Illinois meeting the successful operation of a 7-hp motor at the end of a mile of 2200-volt line of No. 10 iron wire, and another stated he had constructed 32 miles of 1000-volt line, using No. 6 hard-drawn copper wire on 30-foot poles, at a cost of $150 to $200 per mile. At Montrose, Colo., the local electric company built a special lighting circuit six miles long to serve 38 fruit ranches. The line consisted of a single-phase circuit of No. 6 copper on glass insulators, with wooden poles and crossarms, the poles being 30-foot cedar with 6-inch tops, set in concrete foundations to a depth of 18 inches, the pole bottoms reaching a depth of 5½ feet. The cost of this line, with arresters, transformers and meters, was $800 a mile.

A "Farm Circus"—Early Promotional Efforts

The possibilities of electrically powered irrigation attracted the farmers and central station companies of New England. At Arlington, Mass., the Boston Edison Company replaced a steam-pumping installation with a 25-hp motor driving a centrifugal pump at 3600 rpm and pumping about 200 gallons of water per minute against 90-lb pressure. The plant was in constant operation during the very dry period of June and July, 1912, the cost of energy amounting to about $4 per acre per month. But irrigation in this section could never be the load-builder it was in the West, and Eastern farms were smaller, although these disadvantages were partly offset by the greater density of population. Utility companies, therefore, based their rural development campaigns on new uses for electricity. In the summer of 1912 a farm electrification "circus," sponsored by the Boston Edison Company, toured Massachusetts rural areas demonstrating 33 electrically powered farm machines. Judging from surviving accounts, this exhibit was closely similar, if not the prototype, of the Demonstration Farm Equipment Tour—also often described as a circus—which is presently one of the most publicized features of REA's promotional activity.

Progressive farmers responded to these early promotional efforts. Near Poughkeepsie, N. Y., about 1910, the extension of a 2500-volt circuit 1½ miles to serve 35 farmers resulted in the shutting down of six old windmills and the installation of lamps, electric washing machines, fireless cookers, flatirons and incubators, as well as motor-driven barn and field machinery; a dairy farm with 50 cows installed a 2-hp motor with a milking outfit. The rate on this line was 9 cents a kilowatthour. The 1912 Census Bureau report noted that "an increasing number" of poultry farms were being electrified, including one at Muskogee, Okla., of 30,000-egg capacity, said to be the world's largest.

Electrical manufacturers, too, were alert to the possibilities. The General Electric Company in 1911 conducted careful tests on a variety of farm machinery under actual operating conditions. On a farm near Dayton, Ohio, one of these tests demonstrated that the cost of grinding 4000 bu of corn could be reduced from $308 to $160 by doing the work by electric power on the owner's farm instead of hauling to a mill two miles away and hiring the service. This $148 saving, which took account of all charges, was figured on the basis of electric energy at the rate of 5 cents a kwhr, although the rate actually in force at this farm was 3 cents.

Regulation

So far, the farmer as consumer of electricity had received little or no attention from the state commissions regulating public utility operations, except in the approval in a few states, of special farm rates proposed by the utilities. These were based on demand and gave the benefit of off-peak use and, through a sliding scale, of large consumption. That of the Truckee River General Electric Company provided charges, for irrigating purposes, of from 1.2 to 1.7 cents per kwhr, plus 50 cents per month for each rated hp of motors.

The first State public utility commission ruling other than rate-fixing, affecting farmers, appears to have been the decision of the Wisconsin Railroad Commission in 1915 that rural customers must bear the costs of line construction but that the companies must provide the individual service equipment.

Costs and Financing

Various plans were being tried in an attempt to solve the vexatious problem of line-construction costs. In many cases it was obvious that the revenue that could be expected from an installation during the life of the required equipment would not equal the equipment cost. Yet the utilities did not want to see this potential business lost to individual generating plants or some other form of power, and the farmers themselves preferred central station service. Some companies bore the costs even when the only prospect of reimbursement was through greatly increased use of energy in an uncertain future. Others insisted that the entire outlay must be borne by the customer. There were share-cost plans, joint-ownership plans, plans by which the farmer was reimbursed for line costs in electric service. Experiments in using less expensive materials, such as those cited, were numerous, but experience supported the consensus of engineering opinion: that in general such

lines were short-lived, maintenance costs were excessive and power losses were large. The NELA's Subcommittee on Farm Line Construction stated in 1921:

"It is recognized that, in many cases, the heavier construction commonly used in the more thickly settled territories is not necessary in farm lines, because of the scattered territory, the lighter loading, the freedom in many sections from abnormal weather conditions and the isolation of the territories through which such lines are ordinarily constructed. Owing to the fact that a high standard of service is nevertheless expected by such customers and also that failure of such a line usually affects all the consumers served by it, a better grade of construction must eventually be attained, though the cost must be sufficiently low so that service can be furnished at a profitable rate."

Wide Variation in Practice

The subcommittee's survey of farm line construction reflected wide variations in materials and practices, due in part to different service requirements and in part, doubtless, to an effort to reduce costs. Copper, iron, steel and aluminum were being used for wires, with the largest mileage of iron (adopted because of low cost) existing in the Middle West. But "The regulation of these circuits, even for very small electrical loads, has been found to be so poor that recent lowering of the cost of copper has caused copper to be substituted on many of these lines. Iron wire has been successfully used for loads of limited demand at a higher voltage, 11,000 and 13,000 volts, under which conditions the voltage regulation is fairly satisfactory." Span lengths varied from 125 to 400 feet, the longest being used in the Southern Pacific Coast section. The report concluded that, although there was urgent need for the development of specifications for the construction of farm lines sufficiently rugged, yet comparatively inexpensive, sufficient data were not yet available to warrant the formulation of general standards. The next year, however, the subcommittee did suggest certain minimum standards for "heavy loading" rural districts. Iron wire was not recommended.

Rates

The rates charged for rural service in these early years reflected the experimentation in construction and financing, and were themselves experimental. The utility companies had little experience on which to estimate cost of service and probable consumption and revenue were matters for hope and conjecture, rather than calculated expectation. Many attempts were made to establish fair basic rate formulae. One of these was the plan recommended in 1921 by the Committee on Rural Extensions of the Wisconsin Electrical Association.[3]

The committee had made a study of eight line extensions built between 1917 and 1920. On one of these construction cost data were not available. The remaining seven, totaling 62.57 miles of line, served 161 customers, an average of 2.57 to the mile. Total construction costs, including primary line and local equipment, were $76,884, so that the average per-mile cost, over all, was $1,225.57. Two of the lines, having a combined length of 37 miles, used iron wire; the other five, total 25.57 miles, used copper wire. The average cost of the iron lines was $991.76; of the copper lines, $1,563.90.

On the basis of this study the committee recommended a formula by which rural customers would pay the regular city rate plus a "rural charge." This rural charge was to equal each year:

Ten per cent of the total construction cost of the extension, plus the total transformer core losses per year computed at the utility's cost of energy, minus 27 per cent of the annual revenue from the extension resulting from the application of the regular city rates.

The 10 per cent of construction costs represented the committee's calculation of depreciation, taxes, excess operating expense and hazard on rural lines; the 27 per cent of estimated revenue to be deducted was to cover the fixed charges included in city rates.

Half of the total annual rural charge computed under this formula was to be apportioned equally among the customers, half according to installed transformer capacity. In a system made up of the seven lines surveyed, the average monthly rural charge per customer, to be added to his bill at city rates, would have been $3.44, according to the committee's calculations.

Service at Less than Cost

There were few instances in which so scientific a method was actually being applied. The NELA Rural Lines Committee, reporting in 1922 on various rate plans then in use, said: "A large per cent of the rural customers now being served are receiving service at less than cost." It urged the companies to consider all contributing costs in establishing rural rates.

As to the rates actually paid by farmers prior to 1924, about all that can be said with accuracy, in the absence of dependable data, is that they varied widely between geographic regions and even between systems in the same region because of the multifarious methods—many of them only tenuously connected with true costs—used in the determination both of energy charges and guarantees or fixed-charge contributions. In a study published in 1938 (Income Parity for Agriculture, Part III, Section 2) the Department of Agriculture estimated that in the period 1910-14, for a monthly use of 40 kilowatthours in the farmhouse and 60 kilowatthours for farm work, the average farm household rate was 10.3 cents and the average farm power rate 7.5 cents, indicating an average rate of 8.62 cents for the total consumption. In 1924, in the Department estimate, the average rate for the same use was 8.58 cents. These estimates, which exclude guarantees and construction cost charges to the farmer, were based on partial data obtained in 1933 by the Federal Power Commission, from which complicated weighted extensions were made to obtain averages for states, regions and years; they are therefore highly supposititious.[4]

Major Facts Established

The studies and recommendations by the utilities associations were one indication that the pioneer period in the electrification of American farms was about to give way to an era of more systematic and coordinated effort. From the beginning the electric utility industry had recognized rural service as a distinct field, differing in almost every important respect from urban service. The companies had tried many experiments, some of them notably successful, in their endeavor to meet the unique problems it presented. By 1922 certain major facts had become clear:

(1) The cost of rural lines and service facilities must be as low as practicable, but cheapening below reasonable standards of reliability and durability was uneconomic for both farmer and company regardless of which party owned the equipment;

(2) Any appreciable lowering of rates and consequent expansion of service in rural areas could justifiably be brought about only in the way that the same advances had been achieved in towns—by increasing the quantity of energy used by the individual customer, and

[3] NELA Bulletin, Sept., 1921.

[4] Cf. Edison Electric Institute Statistical Bulletin No. 7, 1939, Table 14, showing average revenue per kwhr for residential service as 8.30 cents in 1914 and 7.20 cents in 1924.

(3) To effect this increase in the proportion necessary, coordinated research, experimentation and promotion in farm uses of electricity were required on a larger scale than had yet been attempted.

National farm organizations were becoming increasingly interested in central station electric power as a means of relieving farm drudgery and helping agriculture to recover from the economic depression into which it had followed industry soon after the close of the World War. It was logical that these organizations and the utilities should work together toward solution of their mutual problem. In September, 1922, the NELA Rural Lines Committee proposed to the American Farm Bureau Federation that a cooperative organization be formed to "study the problem and put in form available for the use of anyone interested in the following:

"(a) The various methods by which electrical energy can be profitably utilized on the farm, including research studies of equipment characteristics as well as methods;
(b) The facts regarding the lines and equipment needed to give the farmer electric service comparable in quality with that already given in the industrial field."

This proposal led to the formation of a few months later of the Committee on the Relation of Electricity to Agriculture, in which other farm associations, agricultural colleges, equipment manufacturers, women's clubs and Federal departments joined. For the next 13 years this body, known as the CREA, was a major force in the progress of farm electric service all over America. Its work and achievements were in many respects the most important in the entire history of rural electrification and they constitute an era in themselves.

Summing Up the Pioneer Period

In the first period, from 1906 to 1923, progress had been slow and uneven as measured by today's standards, going ahead by rushes in the Western states where irrigation was a prime factor in agriculture, by scattered and uncertain spurts in other areas where low usage and sparse population obstructed development on a truly economic basis for both utility and farmer. Experiments in line construction and service practices were numerous, but uncoordinated, and in many instances unsoundly conceived.

More important, though now often forgotten, was the fact that the comparatively undeveloped state of the electric industry as a whole imposed a rigid upper limit on the expansion of service to farms. Rural electrification could not become a great national movement while there were still many sizable towns that did not have 24-hour service;[5] a foundation of primary lines had to be established before rural lines could be built on anything approaching a network plan.

Further, during the last third of the 1906-23 period, the mobilization of national resources for the United States' participation in the World War and the first depression following the war had slowed all major economic and social developments almost to a standstill. On the other hand, the war emergency, by depriving the farms of young workers, had sharpened the realization of agricultural leaders that farm prosperity, as well as farm comfort, could be advanced through an abundant supply of inexpensive power. The obvious means was the further extension of central station electric service; the obvious stumbling-block, costs.

A Sound Start

If the achievements of this pioneer period had provided only a start, it was a good start and a sound start. Many utility companies had accumulated technical and service experience which, pooled through the trade associations of the industry, was invaluable in indicating the direction that further expansion of farm service should take. The economy and convenience of electric power had been practically demonstrated to hundreds of thousands of farmers and the number of farm electric applications was constantly being increased.

In 1924, 18 years after the building of the first Hood River line, the total number of farms receiving central station electric service was 204,780. Although this was only 3.2 per cent of all farms in the country,[6] it should be remembered that the period covered was the *beginning* of rural service. At the end of a comparable period in urban electrification (1882-1900) the proportion of urban homes being served was 3.4 per cent,[7] although the conditions for growth were much more favorable in towns. Electric service in towns had grown slowly during its first two decades, faster in the third, then reached a "boom" rate in the fourth and fifth. The electrification of rural areas was to follow a similar pattern.

[5] At the end of 1923, 62 communities with a population greater than 2500, and 7940 communities of 250-2500 had no electric service at all. *EEI Bulletin*, Feb., 1940, p. 45.
[6] 6,371,640 (U. S. Census of Agriculture).
[7] Or less. 10,274,127 non-farm homes (U. S. Census); 350,000 electric customers of *all* classifications.

Looking Forward

(*Continued from page* 374)

franchise and also because of the technical nature of the service, it is the obligation of the operators to see to it that the customer may conveniently and cheaply utilize the service which he wishes to purchase. He should be protected against high cost of repairs to his equipment. And with all this there is the "noblesse oblige" that requires that we shall deal with our customers and our community relationships and other businesses with courtesy and understanding.

It's a new world. It's a new world every day—just as it has been a new world every day since the beginning, because yesterday someone painted a better picture, wrote a better book, discovered a new scientific law, or invented a better way. The world was never the same after Franklin's Kite, Uncle Tom's Cabin, Lincoln's Gettysburg Address, Banting's Insulin, the Ford Flivver, DeForest's Radio Tube, and the Wright's Airplane. The old order changeth — every day! And we must change with it. Otherwise we will not be honestly fulfilling what is required of us by our self-assumed obligations.

Nebraska Power Makes Customer Survey

TO become better acquainted, to provide a medium of selling the cheapness and value of purchased electric service, to develop sales leads on additional use and to uncover any possible dissatisfaction or ideas of competitive sources of power, Nebraska Power Co. is undertaking a special survey of commercial customers. About 10 per cent of all such users on the company's lines, in a group with demands of 4 to 20 kw and using 600 to 4000 kwhr a month have been selected for this. In the main three contacts are made on each. On the first call, a simple questionnaire form is employed to cover systematically the points desired. The second contact is the presentation by mail, of a report on the customer's use of service suggesting profitable further uses. The third contact is a call back for reaction to the report.

Initial results from the first week's experiments with the plan in favorable customer reaction and effectiveness of developing information are gratifying. Later on it is planned to extend the survey to certain industrial customers.

Ready for Lunch at 10 A.M.— After Seeing MKB's New Movie!

—writes prominent utility executive

THE Vice President in Charge of Sales for a large eastern utility writes to The Modern Kitchen Bureau:

"The first thing this morning, I had the opportunity of reviewing the new film of The Modern Kitchen Bureau. Perhape I can best express its excellent effect upon me by saying that although I had just enjoyed a substantial breakfast, I was more than ready for lunch after I had seen the film, even though it was as early as 10 A.M. I believe that you really have something.

"I also feel that its appearance is unusually opportune because, if conditions surrounding merchandising and other utility sales activities become much more restrictive, it may be necessary for all of us to devote much more time to market studies, promotion and the education of the public, and your picture can play a very important part in connection with the last two of these activities.

"A number of our people witnessed the showing of the picture this morning and, for the first time in my utility experience, despite their divergent points of view they were unanimous in approval of the film. What impressed us most, I think, were striking colors, the tremendous food appeal, and the subordination of commercialism, with respect to specific appliances, to the presentation of the advantages of all the features, whether electrical or not, that go to make up a planned modern kitchen."

This comment is typical of those received by the Bureau from utility merchandising men, dealers, distributors and home economics experts who have to date seen "It Happened in the Kitchen," The Modern Kitchen Bureau's new full color talking motion picture. No other promotion ever offered by the Bureau has won such universal acclaim—no other promotion has presented the story of the modern, planned, all-electric kitchen in such a dramatic, lasting manner as does this film.

Meet Mr. and Mrs. Jones, stars of the new MKB picture. They're shown here planning how they'll modernize their old kitchen—transform it into a modern all-electric kitchen that will save work and steps. The tiny scale model helps to get each appliance and cabinet just where Mrs. Jones will find them most convenient.

In forty minutes of fast moving entertainment, "It Happened in the Kitchen" tells to audiences of several hundred people at a time the story of all-electric kitchens in a way once possible with only one or two persons—when the salesman sat down with prospects and went over the story step by step. Using breath taking color photography and refreshingly realistic homemakers, husbands and children, the picture shows typical examples of all types of kitchens—large and small, old and new, city, suburban and farm—explains the reasons for the three kitchen work centers and the various basic arrangements—and dramatizes the convenience and ease afforded the housewife by electric ranges, refrigerators, water heaters, roasters, dishwasher sinks and all the other kitchen appliances.

To help utility executives to see "It Happened in the Kitchen," and judge for themselves its value in their respective territories, The Modern Kitchen Bureau's eighteen Regional Directors are sponsoring preview showings throughout the country. Utility sales and promotional men are invited to attend the showing nearest their offices. For the name of your Regional Director, write

(*Continued on page* 396)

This "two-wall" kitchen, featured in MKB's new motion picture, shows that a kitchen need not be large to be modern and beautiful. New ideas for homemakers, such as the breakfast table shown which folds up into the wall when not in use, and dramatizations of the services of electrical appliances abound in this film.

Air Conditioning Installed in 1940

CONTINUED progress in the installation of air conditioning equipment is shown by the Third Annual Report of the Air Conditioning Committee of the Edison Electric Institute,* covering load connected in 1940. This compilation lists the various types of installations of 177 operating utility companies serving approximately 20,843,000 customers (or about two-thirds of the total in the United States). As reported by these companies, 15,778 installations were made during 1940, compared with 12,534 in 1939. Total horsepower connected in 1940 was 148,341 as against 134,805 during the previous year. The grand total of all installations in the territory served by the 177 reporting utilities at the close of 1940 was 63,468 and the installed horsepower was 1,083,121. The corresponding totals as of December 31, 1939, were 47,690 installations with 934,780 hp.

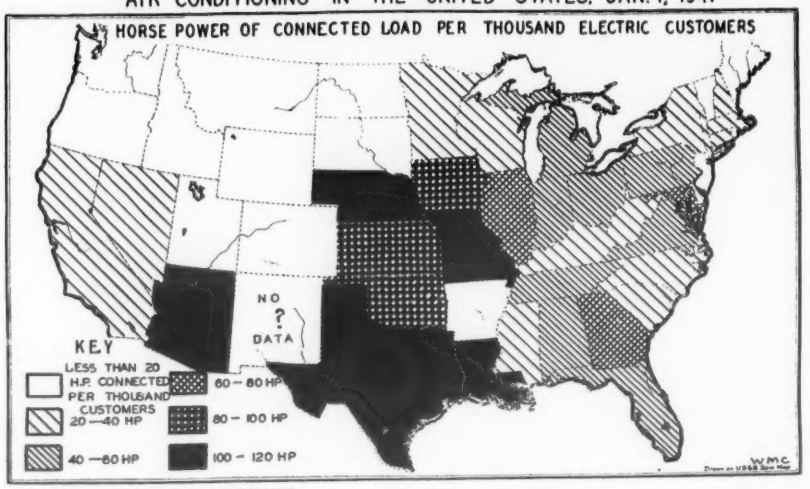
The increase in the number of total installations was largely in the residential class and in miscellaneous office buildings, where the average installations were from 1 to 3 horsepower. In the industrial classification, the greatest progress was made in metal working plants, largely connected with new defense industries.

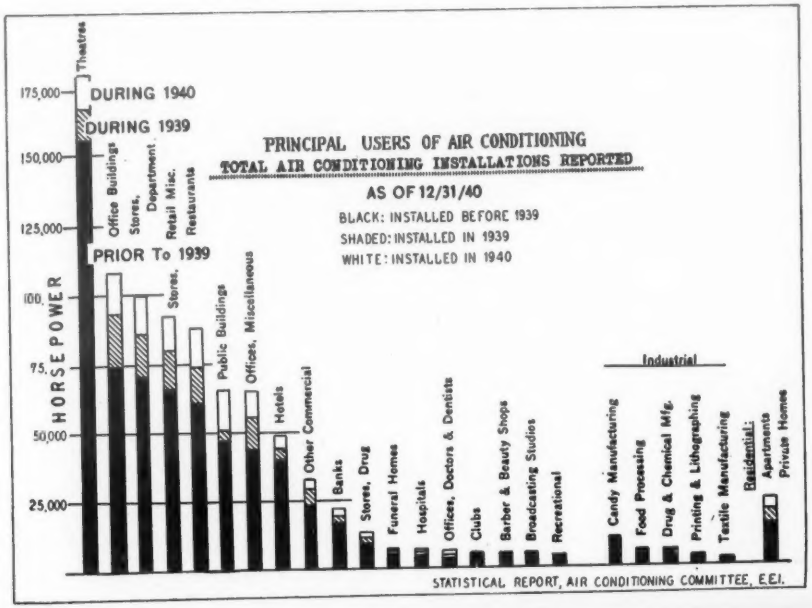
The adjoining chart shows the horsepower of air conditioning load per thousand customers reported by the companies in the various states and the tabulation below the chart gives the total reported as of Dec. 31, 1940, with the development of the load shown graphically on the chart. The tabulation below shows the number and horsepower of installations in the residential, commercial and industrial categories.

* Edison Electric Institute, 420 Lexington Ave., New York, $1, per copy.

APPLICATION	PRIOR To 1939		DURING 1939		DURING 1940		TOTAL AS OF 12/31/40	
	No.	HP*	No.	*HP	No.	*HP	No.	*HP
Residential:								
Apartments	10,118	13,787	2,972	3,928	5,242	4,009	18,332	21,724
Private Homes								
Commercial:								
Apartments	58	1,626	17	856	11	184	86	2,668
Banks	392	17,229	136	2,150	119	2,750	647	22,129
Barber & Beauty Shops	503	3,562	168	774	134	765	805	5,101
Broadcasting Studios	117	4,281	34	517	26	153	177	4,951
Clubs	196	3,963	61	950	59	626	316	5,539
Funeral Homes	531	5,229	168	1,215	153	1,192	852	7,636
Hospitals	310	4,542	95	1,891	96	936	501	7,369
Hotels	813	39,619	281	5,404	202	3,858	1,296	48,881
Office Buildings	622	73,591	183	19,749	230	15,686	1,035	109,026
Offices, Doctors & Dentists	943	3,144	730	1,117	950	2,156	2,623	6,417
Offices, Miscellaneous	5,908	44,011	2,462	10,705	3,254	10,368	11,624	65,084
Public Buildings	298	47,859	62	3,696	46	15,109	406	66,664
Recreational	84	1,828	50	1,131	80	1,236	214	4,195
Restaurants	3,473	61,006	1,181	13,400	1,163	13,750	5,817	88,156
Stores, Department	630	70,961	166	16,334	189	13,532	985	100,827
Stores, Drug	588	8,382	238	2,188	236	2,501	1,062	13,071
Stores, Retail Misc.	3,676	65,968	1,285	14,105	1,124	12,630	6,085	92,703
Theatres	1,700	156,597	283	11,888	242	11,849	2,225	180,334
Other Commercial	952	23,217	458	5,915	440	4,144	1,850	33,276
	1	5	317	148	65	41	383	194
Industrial:								
Candy Manufacturing	157	9,400	26	611	26	310	209	10,321
Drug & Chemical Mfg.	83	5,335	11	377	21	317	115	6,029
Printing & Lithographing	64	2,950	15	1,343	14	307	93	4,600
Textile Manufacturing	40	1,924	9	317	20	1,334	69	3,575
Tobacco Manufacturing	27	1,510	1	5	6	68	34	1,583
Metal Working	7	767	7	280	20	1,626	34	2,673
Food Processing	220	4,435	48	807	69	1,054	337	6,296
Fur Storage	73	397	44	230	37	216	154	843
Other Industrial	1,282	64,760	164	4,303	218	8,043	1,664	77,106
**Miscellaneous	1,290	58,090	862	8,469	1,286	17,591	3,438	84,150
TOTAL INSTALLATIONS	35,156	799,975	12,534	134,805	15,778	148,341	63,468	1,083,121

TOTAL AIR CONDITIONING INSTALLATIONS REPORTED BY 177 COMPANIES





EEI Sponsors First Two-Day Conference for Home Service Directors and Economists

TWO full years of war in England have shown us that utility home economists are of the greatest service in educational work among all classes of customers. They have helped to develop the art of preparing nutritious, well-balanced meals from limited varieties of food, to spur economical use of electricity in the home, and to rehabilitate older appliances for continued efficient use.

As we approach the emergency period, the utility industry will find these problems growing in importance.

It was with these thoughts in mind, and as a preparation for the months to come, that the Home Service Committee of the Edison Electric Institute sponsored the first two-day conference of home service directors, home economists and nutrition experts. Held on September 4-5, at the auditorium of the Electrical and Gas Association of New York, Inc., the conference attracted a registration of 266 guests who heard the importance of the home economist emphasized, saw the newest ideas for demonstration of all types of appliances for cooking and lighting applications, and learned the latest facts just developing in the National Nutrition Program, menu planning, and preparing nutritious meals from available foodstuffs.

Thursday Morning Session

Opening remarks by Miss Fern Snider, chairman of the Home Service Committee and Home Economics Director, Georgia Power Company, who organized the conference, were followed by Mr. A. E. Schanuel, of the National Adequate Wiring Bureau, who spoke on the necessity for adequate wiring; Miss Myrtle Fahsbender, Residence Lighting Specialist, Westinghouse Electric & Manufacturing Company, speaking on "Modern Lighting for Modern Living," and by Mrs. Irma Jenner, Graybar Electric Company, with the latest ideas in sewing machine presentation.

Miss Edwina Nolan, Manager Home Service Section, General Electric Company, concluded the first session with a "Patriotic Call to Homemakers." Miss Nolan discussed the planning of protective diets with sufficient vitamins, the functions of the electric range, refrigerator, etc., in preserving these natural food elements, and the need for housewives to conserve their strength with labor-saving appliances.

MISS SNIDER

Thursday Afternoon Session

Miss Lynne Fox, Director Home Service Staff, Landers, Frary & Clark, presented the economic advantages of owning an electric range, with several unusual cooking feats for the home service personnel to use in attracting and holding the attention of the casual observer.

Miss Marguerite Pressnell, Home Service Director, Detroit Edison Company, featured a novel idea to demonstrate the cheapness of electric service in her presentation. Miss Ruth Graham, of Electromaster, Inc., showed how to incorporate the economy angle of utilizing available foodstuffs with the nutrition story, and the added dash of glamor that interests adults as well as children in eating healthful foods.

Miss Mildred Nichols, Director, Home Economics, Graybar Electric Company, Polly Gade and Isabel DuBois, Nash-Kelvinator Corporation, concluded the day's sessions with new ideas for demonstration of electric appliance advantages.

Friday Morning Session

"It Happened in the Kitchen," The Modern Kitchen Bureau's new full color talking motion picture on modern all-electric kitchens was previewed by the conference and received an enthusiastic welcome. MKB Chairman Walter H. Sammis introduced the picture, which presents the story of planned electric kitchens and their major appliances in forty minutes of fast moving entertainment.

Mr. Sammis pointed out that a complete promotional program is offered by the Bureau in connection with the picture, including suggestions for its most profitable use, direct mail and other aids to help attract audiences, in order to make each showing as profitable as possible for the utility company.

Henry Johnson, Kitchen Planning Consultant, Connecticut Light & Power Company, told the audience how an inexpensive kitchen planning kit, complete with tiny appliances, cabinets, etc., can be brought to the customer's home to dramatize "the way your kitchen can look!"

Miss Helen McKinlay, of the Lamp Division, General Electric Company, brought the conference up-to-date on the latest developments in lighting equipment. Mrs. Dorothy Tucker, Buffalo Niagara Electric Corp., and Mrs. Blanche Card, Boston Edison Company, discussed "Lighting Presentation Ideas," showing how customer's hobbies may be used as starting points for the demonstration of the need for adequate lighting intensities.

Miss Clara Jahn, Director Home Economics Department, Edison General Electric Appliance Company, analyzed the importance of the electric range in preparing better foods as prescribed by the National Nutrition Program, and the extensive use of electric appliances as time releasers to permit housewives to take more active part in civic welfare and other organizations of current interest.

Friday Afternoon Session

The need for recipes, menus, etc., suitable for mass distribution to customers was emphasized by Mrs. Bill Schnirring, Swartzbaugh Manufacturing Company.

New tricks for demonstration of the

TOTAL AIR CONDITIONING INSTALLATIONS REPORTED BY 177 COMPANIES
STATISTICAL REPORT, AIR CONDITIONING COMMITTEE, EEI.

versatile electric roaster were presented by Mrs. Anne Sutter, Home Service Director, Duquesne Light Company.

Mrs. Julia Kiene, Manager Home Economics Department, Westinghouse Electric & Manufacturing Company, and Miss Charlotte Ferris of Westinghouse showed how "Electric Living is Healthful Living" with the new "Vitamized Meals" and their quick, easy preparation on modern electric appliances forming the theme of the conference's last presentation.

In closing the "Parade of Demonstration Ideas," C. E. Greenwood brought out that the concept of holding such a Conference had been initiated by Miss Snider, and the Program developed had been in the nature of an experiment. The results were so praiseworthy that a similar Conference should be held next year.

Commercial News Notes

THE war boom has been booming at such a pace that we may find industrial peaks being gained in advance of expectations. One expects in these times that all plants are running at full capacity. But it is important to point out that there are thousands of both large and small industrial plants that have idle machines that could be adapted to war work.

At the same time OPM surveys the field for supplies of vital material for production of National Defense goods, it likewise is searching for industrial plants to turn this stupendous volume of material into armament necessities. Only this month the president of General Motors states that notwithstanding new automobiles produced, his company had about 500 Defense contracts and that still their 60 plants in 35 cities could take on more.

The president of General Electric Company advises that to speed production of Defense items they farmed out about $20,000,000 worth of orders to nearly 400 small manufacturing firms and therefore cut down delivery period. However, it is recognized generally that all-out production for National Defense is only off to a fair start.

If the government makes known its needs, the smaller industrialists can determine what they can produce. There is opportunity for good business for many smaller business men who were concerned about their future.

The electric utility company is peculiarly fitted to render a helpful service to the new Division of Contract Distribution in OPM under the direction of Floyd B. Odlum, because it is a source of knowledge of, and acquaintance with, many small industrialists with idle capacities and with machines that could be re-vamped to turn out Defense material. Many utility companies even now have been cooperating in searching out such industrialists and stimulating interest in soliciting this government business. Others are being approached for early action.

May this method of "doing our bit" in the electric utility industry proceed apace.

Top Rating for Electric Water Systems

THE electric water system has been granted highest civilian priority by OPACS. In fact this applies to the farm equipment business because it is recognized that the electric water system is vital in food supply. A plan has been worked out among the manufacturers of electric water systems for the supply of twelve different metals involved in the manufacture of the parts and accessories.

The Electric Water Systems Council is highly gratified with this situation which enables the Council to continue the work of promoting nationally among rural and semi-rural customers, the advantages of running water in food production and in better living conditions.

Women and Kitchens

TO those who may not be sold on the advantages of Kitchen Planning and its importance in any emergency, there are two pertinent points of interest. England has been war-torn for two years, but the Electrical Association for Women is to have its annual convention on schedule within the next few weeks. The theme of the convention is "Post-War Construction" and a feature on the program will be Kitchen Planning.

Again it should be pointed out that the recent figures published by the National Safety Council show an approximate average of 1800 accidents a day in the homes of U. S. A., some of them fatal. Among the potent reasons for these are failure to properly light stairways, and also poor arrangement of furniture and equipment, especially in the kitchen. It would appear that kitchen planning is a live subject under all circumstances.

While on the subject of kitchens the results of the recent survey of *McCall's Magazine* on WHAT AMERICAN HOUSEWIVES WANTED is enlightening. Over 4000 women entered the contest.

The breakdown indicated strong preference for larger kitchens with provisions for eating there. There is definite desire for more efficient arrangement of appliances in kitchen planning, the refrigerator-preparation center being considered the best step-saver. In this dream kitchen approximately 60 per cent wanted an electric refrigerator and an electric range.

Time Payments

THE Board of Governors of the Federal Reserve System has taken action in connection with the tightening of installment buying in order that civilian supply may be curtailed. Down payments were established at 20 per cent of the purchase and 18 months set particularly on the purchase of electrical household equipment. Early indications are that with the present expanded market for electrical goods volume will not be seriously affected by the new buying schedule. It is pertinent that in Britain, the demand for electrical equipment has increased as homemakers have been called to the factories and also for a wide diversity of manual labor outside of the home. They find the quickest and easiest method of preparing their meal when they arrive home is by "electric cookers" of different varieties. Electricity as a fuel is an essential.

Demand for electric labor-savers will increase in this country as in World War No. 1, because domestic servants become industrial workers as they are attracted by higher wages. Also, wives and families of men in the service require simplified housekeeping. Unfortunately, the shortage of basic materials may create a different situation in meeting consumer demands than during the last war in which this country was engaged. But attempt by both manufacturers and utilities will be made to keep the "home fires burning" electrically.

EHFA has revised its minimum down payments and maximum maturities. The finance charge remains at 5 per cent on the original unpaid balance. The time has been set at 18 months for ranges and

HOME MANAGEMENT CORNER

CONDUCTED BY *Miss Switch*

Farming
IN THE BACK GARDEN

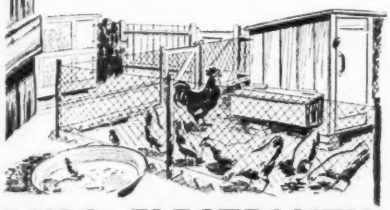
WITH A SMALL PATCH of ground, or even a back yard it's surprising how you can help yourself and the country. This is a big subject but here are a few suggestions:

POULTRY. Buy six month old pullets from a reliable source and feed ¾ cooked house scraps and ¼ mash. The County Poultry Instructor will help you get started and you should write for 'Growmore' leaflets Nos. 5 and 14 published free by the Ministry of Agriculture, 10, Whitehall Place, London, S.W.1.

RABBITS. Rabbits are a really valuable addition to the meat ration — and can be fed largely on house scrap and green stuffs from the hedgerows. Breed pure stock for food and valuable furs. Breed cross-bred stock for food only. Rabbits are cheaply accommodated in little space and make a fascinating and profitable hobby. Advisory leaflets 161 and 162 costing 1d. each from the Ministry of Agriculture are useful to beginners.

GOATS. Keeping a goat is not as ambitious as it sounds and can be a good investment. A milch goat provides palatable milk that is good for children and invalids and makes excellent cheese and butter. They are not expensive and are easily kept. Milk twice daily and groom regularly. A supply of cheap green food or rough grazing must be available as well as a dry, warm shed and a suitable place for exercise. The Ministry of Agriculture publish Advisory leaflets No. 18 on Goat Management at 1d.

PIGS AND PIG CLUBS. Pigs are one of the most useful methods of converting kitchen waste into good food and they do not require elaborate housing. You can keep one or two yourself or do it collectively by joining a 'Pig Club.' Clubs insure the stock, collect and distribute food, obtain the necessary killing licence and arrange purchase of pigs, or even make loans to help with this. The Small Pig Keepers' Council, Victoria House, Southampton Row, London. W.C.1, will advise intending pig owners.



S.W.S. ELECTRICITY

WORCESTERSHIRE & STAFFORDSHIRE ELECTRIC POWER COMPANY
Central Office: MUCKLOW HILL, HALESOWEN
Electricity Service Centres

ABERGAVENNY	BROMSGROVE	EVESHAM	LEDBURY	STRATFORD
BANBURY	BROMYARD	HALESOWEN	LUDLOW	ON AVON
BEARWOOD	BUILTH WELLS	HAY	OLDBURY	TALGARTH
BISHOP'S	CHURCH	HEREFORD	REDDITCH	TEWKESBURY
CASTLE	STRETTON	KIDDERMINSTER	RHAYADER	UPTON
BRECON	DROITWICH	KINGTON	ROSS ON WYE	ON SEVERN
BRIDGNORTH	DUDLEY	KNIGHTON	SMETHWICK	WEST HAGLEY

refrigerators. Longer terms formerly in force on dairy and other farm equipment will continue. The "Regulation" of the Fedeal Reserve Board will not apply to milk coolers, cream separators, milking machines, feed grinders and motors.

All Clear for Rural Sales

THE priorities granted for materials for manufacture of electric water systems and specified dairy farm equipment, together with the release of such material from restriction on finance terms by the Federal Reserve Board, is a reminder that there is a fertile field for selling in rural communities. Helping the farmer to install mechanical equipment at a time when the supply of farm labor is rapidly diminishing, is direct aid to National Defense effort. Food supply is of basic importance. The potential market for dairy equipment in particular is expanding. Call for more dairy products is loud and insistent.

Many readers will recall our war gardens of 1917 and 1918. These are popular in England today. In fact the idea is being encouraged by Home Service women attached to utility companies. An advertisement, appearing in British newspapers, is reproduced on these pages is illustrative of this promotional phase in organization for the food maintenance problem.

The problem of home management in our country becomes an important study for commercial departments of utilities. —C. E. G.

Commercial Electric Cooking Conference to Be Held in Chicago, Oct. 9

THE Fifth Annual Conference of utility commercial electric cooking sales executives and equipment manufacturers, sponsored by the Commercial Electric Cooking Council, will be held at the Hotel Knickerbocker, Chicago, Ill., on Thursday, Oct. 9, J. F. Porter, Jr., chairman of the Council, and vice-

Can You Answer These 6 Questions?

1. What most important factors influence a decision to buy electric cooking equipment?
2. Why are sales lost because salesmen misuse "Food Cost?"
3. Why do restaurant men dislike some salesmen—like others?
4. Which minimum uses of electric service applications are required in a modern cafeteria?
5. What are the most effective closing arguments in selling owners of counter service restaurants?
6. Which trends in restaurant operation open new markets for electric cooking salesmen?

Find the Answers in

"SALES TRAINING MANUAL COMMERCIAL ELECTRIC COOKING"

Commercial electric cooking salesmen have to answer tougher questions every day—and if you want your cubs to have training that makes them quick producers, your veterans to review their methods in the light of up-to-date experience, see that every member of your commercial sales force has a copy of this new manual.

Here's a complete, accurate picture of the restaurant man—his likes and dislikes among salesmen, sales talks, appliances—how he operates different establishments—his food cost—how and why he buys equipment.

Here are 124 practical selling points for electric cooking equipment—how to use them in cafeterias, table and counter service restaurants, soda fountains, tea rooms. (This feature alone will be used before every contact!)

"Sales Training Manual—Commercial Electric Cooking" fills a long-felt need. Packed with facts that can be used on every call to sell electric cooking, it is, to our knowledge, the first authoritative, impartial manual on selling commercial electric cooking, written from the restaurant man's point of view.

Send in the coupon below. Read the manual and see if you don't agree that your salesmen deserve it—your commercial load needs it!

60 pages—8½"x11"—124 selling points—hundreds of facts on selling commercial electric cooking in this new training and reference manual.

Two More Promotional Aids:

"FOOD SERVICE NEWS"—This mailing piece, published monthly by the Council for distribution by utilities, keeps the company name and commercial electric cooking service before this specified group of customers at extra-low cost. Shows restaurant men what others have done with electric cooking—supplies profitable ideas.

MAILING PIECES—Two direct mail folders that drive home the speed, accuracy and convenience of every major type of electric cooking equipment. Use photographs, hard-hitting copy—ideal for a special campaign aimed at this profitable load!

Samples of "Food Service News" and mailing pieces available on request. Use coupon at right.

COMMERCIAL ELECTRIC COOKING COUNCIL,
420 Lexington Ave., New York, N. Y.

Please send me one copy of "Sales Training Manual—Commercial Electric Cooking," at $1.50, and information on quantity prices. Also, sample copies of "Food Service News" and direct mail pieces.

Name .....
Company .....
City .....
State .....

president, Kansas City Power & Light Co., has announced.

More than 150 guests are expected to attend the conference, which will be most important in view of effects of the national emergency activities.

Manufacturers appearing on the program will describe the effects of the defense program and priorities upon the design and delivery of electric cooking equipment. Advice on ordering of stock and spare parts is expected to prove of great value to utility men and dealers attending the conference. They will also see the latest ideas in cooking equipment, and the newest promotional methods offered by the manufacturers.

A Sales and Servicing Clinic arranged by utility men will feature their part of the program. The sales presentations of several outstanding installations, and the latest thoughts in utility circles on policies of servicing equipment will be highlights of this session.

The round table form of discussion will be encouraged at the Conference, and is expected to increase the effectiveness of the exchange of ideas.

The Commercial Electric Cooking Council's new Uniform Test Data Forms for tests conducted by utilities on operating characteristics of commercial cooking and baking load will be described, and their value to the industry illustrated.

Since the conference is to be held in conjunction with the annual convention of the National Restaurant Association, utility men, dealers and manufacturers attending will find a valuable opportunity to learn what their customers are thinking, and to get the customers' point of view on the future demand for commercial electric cooking.

Advantages of Small Diameter Wire Stressed at Meeting

SPEAKING before the Eighteenth Annual Meeting of the Southwestern Section, International Association of Electrical Inspectors, at San Jose, Cal., on Aug. 26, E. J. McConnell, Technical Advisor, Wiring Sales Committee, EEI, told how the new small diameter wires can be used for rewiring of commercial and industrial buildings, in order to secure additional electrical capacity at the minimum of expense.

"Proper use of small diameter wire, with proved methods of recircuiting and installation, offers extra capacity and increased rentals to building managements. For the utility industry, small diameter wire will make possible increased use of utility service, and will eliminate low voltage and other problems," said Mr. McConnell, as he summed up the advantages of the new wire.

Some of the more important possibilities and results obtainable by new circuit arrangements and types of service supply to the wiring system were described by Mr. McConnell. "It is easy and economical to double the capacity and halve the voltage loss in many branch circuits, without disturbing the raceways. Similarly, a feeder circuit may often be increased in capacity," he said.

One typical building, rewired with small diameter wire, has its electrical utilization capacity increased four times, at a cost of 15 cents per square foot. New lighting equipment was installed, which increased lighting intensities from 8 ft. candles to 40 ft. candles, the speaker stated.

The cooperation of local electrical inspectors is important to utility companies, contractors and architects, Mr. McConnell said, in securing the benefits of rewiring for building owners and occupants. Approval for the safe and economical solutions of special rewiring problems through the use of small diameter wire may depend upon the inspector's up-to-date knowledge of its many applications.

Copies of "Rewiring for Commercial and Industrial Buildings," a new handbook of information on small diameter wire recently published by Edison Electric Institute, were distributed to the audience of inspectors and met with an enthusiastic welcome.

Pennsylvania Electric Association Convention

L. B. ROUND, vice-president and general manager of the Pennsylvania Power Company, was elected president of the Pennsylvania Electric Association, at its 34th annual convention, held at Bedford Springs, Sept. 3-5.

In presenting the theme of the convention, "Electric Utilities in Today's Economy," President E. C. Stone asked seven questions which formed the basis for the discussion. These questions covered adequacy of supply and a sound future, cooperation with defense program and customer service, priorities and standards of service, sales problems, air raid cooperation, civilian defense and, finally, loss of man-power.

Leo T. Crowley, chairman of the board, Standard Gas & Electric, took up the problems of finance, which included new construction and rate regulation. He urged that government financing assistance be given to utilities for defense facilities greatly in excess of normal future requirements. Where a normal need in the future can be foreseen the utility should use its own funds and credit.

In discussing sales problems, George E. Whitwell, vice-president Philadelphia Electric, urged three things with respect to industrial and commercial sales: (1) Obtain as much permanent business as possible; (2) promote newer uses and processes; (3) sell larger power in relation to the national emergency by helping the program in every way possible. While availability of equipment and tightening of terms were adverse factors in the residential field, Mr. Whitwell saw advantages in larger spending power and in opportunity to develop new sales approaches and selling methods. He particularly urged that all programs be flexible to meet whatever may arise. Sales promotion should be continued against the time when the emergency is over.

Some general suggestions on customer relations were made by Dr. Claude Robinson. The effect of the emergency on such relations was outlined by P. H. Powers, vice-president, West Penn Power, who stated that the public might blame industry for sub-normal service due to power, equipment and labor shortages, to appliance shortages, dividend reductions, sabotage, accidents, and labor troubles. This, he pointed out, is only natural and the industry must not feel offended. Instead it should have a well-considered public relations viewpoint and plan.

The solutions to operating problems, according to N. G. Reinicker, vice-president and general manager, Pennsylvania Power & Light, are nothing more than good economics. The emergency, he stated, has forced the industry to new ways.

Some of his suggestions are as follows: Replace overloaded equipment only after all other means have been exhausted; ideas on operating reserve may have been too generous; maintain all equipment for immediate use; make greater use of mobile capacity equip-

(*Continued on page* 396)

Fall Meetings of Engineering Committees

Accident Prevention Committee

GEORGE S. DIEHL, *Chairman*

The fall meeting of the Accident Prevention Committee will be held at the General Offices of the Edison Electric Institute, 420 Lexington Avenue, New York City, October 27 and 28. George S. Diehl, chairman of the Committee will preside at this meeting.

The tentative program for the meeting follows:

October 27—9:30 a.m.

Accident Statistics—
E. J. Kreh, Duquesne Light Co., Pittsburgh, Pennsylvania.

Presidential Proclamation on Accident Prevention in National Defense—
R. M. Godwin, Philadelphia Electric Co., Philadelphia, Pennsylvania NSC Liaison Representative.

Highway and Street Safety—
H. F. Webb, West Penn Power Company, Pittsburgh, Pennsylvania.

Transmission Problems—Overhead and Underground—
H. O. Sprinkle, Monongahela West Penn Public Service Co., Fairmont, West Virginia.

October 27—2:00 p.m.

The Scientific Approach in Selecting the Right Man for the Job—
Dr. M. S. Viteles, Director of Personnel Research and Training, Philadelphia Electric Co., Philadelphia, Pennsylvania.

Employee Training—
C. N. Rakestraw, The Cleveland Electric Illuminating Co., Cleveland, Ohio.

Station Accident Prevention Problems:
Electric Stations—
D. C. Stewart, Buffalo Niagara & Eastern Power Corp., Buffalo, N. Y.

Steam Stations—
F. H. Davies, The Detroit Edison Co., Detroit, Michigan.

Hydraulic—
George S. Diehl, Pennsylvania Water & Power Co., Baltimore, Maryland.

October 28—9:30 a.m.

Round Table Discussion—(Closed Session)—
Lead By—W. A. Buchanan, Appalachian Electric Power Co., Welch, West Virginia.

Resuscitation—
W. R. Smith, Public Service Electric & Gas Co., Newark, N. J.

Public Safety—
A. A. Rall, Kansas City Power & Light Co., Kansas City, Missouri.

Low Voltage Hazards—
C. B. Boulet, Wisconsin Public Service Co., Milwaukee, Wisconsin.

October 28—2:00 p.m.

Publicity—
W. T. Rogers, Ebasco Services Inc., New York, N. Y.

Employee Health—
Wills Maclachlan, Toronto, Canada.

Occupational Hazards—
E. E. Grover, The Columbus & Southern Ohio Electric Co., Columbus, Ohio.

Shops, Commercial Departments and Offices—
F. W. Brockhoff, Union Electric Company of Missouri, St. Louis, Missouri.

New Ideas, Devices and Materials—
H. J. Burton, Consumers Power Co., Jackson, Michigan.

Liaison Representatives—

Electrical Equipment Committee

R. W. WILBRAHAM, *Chairman*

The fall meeting of the EEI Electrical Equipment Committee will be held in the Hotel Cleveland, at Cleveland, Ohio, on Monday and Tuesday, October 13 and 14. As a result of the national defense problems in the utility industry many problems of managerial nature have arisen, bearing directly on the work of the Electrical Equipment Committee, including questions relating to personnel, priorities and procurement of materials, and unusual maintenance and operating problems. To allow adequate time for presentation and discussion of these and related matters, all day Monday, together with Tuesday morning, has been scheduled for closed sessions, attendance at which is limited to committee members and guests sponsored by members.

Transmission and Distribution Committee

E. V. SAYLES, *Chairman*

The fall meeting of the Transmission and Distribution Committee will be held at the Netherland Plaza Hotel in Cincinnati, October 20, 21, and 22. E. V. Sayles, incoming chairman, will preside at this meeting.

The first day of the meeting will be devoted to a program of the Underground Group of the Committee under the chairmanship of T. G. Hieronymous, superintendent of underground systems of the Kansas City Power and Light Company. Arrangements have been made during the program for a discussion on the Simplified Practice Cable Specifications of the Association of Edison Illuminating Companies, which has recently become avaliable. There will also be a discussion of Cincinnati's AC Network and 66 KV Oil-filled Cable Installation together with an opportunity to take an inspection trip to this installation by those who can arrange to do so. Plans have also been made for a continuation of the Committee's discussion on Cold-Setting Compounds, a subject which is being investigated to develop a cold-setting compound for use in making emergency cable joints and connections.

In addition to the above presentations, Mr. Hieronymous is planning to hold a closed session round-table discussion at which time operating problems in connection with underground systems will be discussed.

One of the main features of this meeting of the Transmission and Distribution Committee are two sessions whereby power company engineers may obtain up-to-the-minute information on what is taking place in the industry to meet the rapidly expanding power requirements for the National Defense Program and to offer an opportunity to discuss with

each other specific problems which they are encountering in their own systems in supplying these new loads.

The session on Tuesday morning, October 21, will include such subjects as the following:

1. Report of the Plant Coordination Group.
2. Status of the National Electrical Safety Code.
3. Crossing Specifications.
4. Current Problems of interest under this Group of the Committee.

H. A. Dambly of the Philadelphia Electric Company will preside at this session.

A luncheon meeting has been arranged for Tuesday, October 21, at which C. W. Kellogg, president of the Institute, will be the guest speaker. The program for the remainder of the afternoon includes the following subjects and speakers:

Expanding Electrical Systems for Defense Needs, S. M. Dean, Chief Asst. Supt. of Electrical System, Detroit Edison Company.

Emergency Capacity in Distribution Systems, T. G. Hieronymous, Supt. of Underground Systems, Kansas City Power and Light Company.

The Priority Situation, Col. H. S. Bennion, Vice President and Managing Director, Edison Electric Institute.

It is planned to hold an informal discussion on each of these presentations.

The session of the meeting scheduled for the morning of Wednesday, October 22 is a round-table discussion on the supply of materials. Frank E. Sanford, Distribution Engineer, Cincinnati Gas and Electric Company and Chairman of the Standards and Specifications Group of the T & D Committee, will preside. At this session it is planned to stress particularly such topics as:

1. Possibilities of substitutions of other materials for those which are particularly scarce.
2. Possibilities of more salvaging of old materials.
3. Changes in practice to save materials, to accommodate substitutions or to make greater use of present facilities.

The Wednesday afternoon session with G. H. Fiedler of the Rochester Gas and Electric Corporation presiding will include a paper on the Coordination of Distribution Fuses, Mounting of Distribution Transformers, Utilization Voltages, and progress reports on a number of current studies that have been underway in the Transmission and Distribution Committee.

Engineers of Power Companies are invited to attend any or all of the above sessions.

Who Are The Capitalists?

An editorial from Rail & Wire, published by Wisconsin Electric Power Company.

IT is a well understood fact that business depends upon three important groups of people—the customers who buy the goods or services that business offers for sale; the workers who produce the goods or services, and the investors who furnish the necessary capital funds for plants, tools and equipment. Without all three of these elements, there just wouldn't be any business.

Equally true but not always so well understood is the fact that each group should get reasonable value for its part in the free exercise of business. The customer values what he buys more than the money he pays. The worker exchanges his labor for wages. The investor also expects compensation for furnishing the essential funds. Without the likelihood of some advantage to be received, no one would ever take the trouble to save up and invest any money.

Now what manner of people comprise these three groups? Are they three distinct types, or are they by and large all the same people?

There's no question as to who the customers are. Everybody is a customer because, under our mode of living, everybody needs and wants many of the things that other people produce.

There isn't any doubt about who the workers are. Except for the very young, the very old, the handicapped and the rapidly diminishing number of unemployed, practically everyone is engaged in some useful occupation.

There shouldn't be any mystery, either, about who the investors are, although their identity is sometimes shrouded in vague terms such as "moneyed interests" or "capitalists."

Who are these people? Are they a different breed, a small, select group of inordinately rich? Or are they mostly just regular working people like you and me?

The facts show that in great majority they are just plain folks—millions and millions of them, and they include you and me. There are a few exceptions, of course, of very wealthy families owning large enterprises, like the Fords and the Du Ponts; but there are not nearly enough large fortunes to finance more than a very small part of American business.

The legislators know this. Do you think that those who depend upon votes for political jobs would tax our incomes, our homes, our gasoline, our cigarets, our movie shows and what not if government could be financed by taxing the rich alone? Even if the total wealth of all the millionaires were confiscated to run government, there'd still be heavy taxes for all of us to pay.

Then where does all the money come from to build and equip our factories, stores, mills, mines and other business establishments? It comes, directly and indirectly, from practically everyone except the pauper and the absolute spendthrift. Direct investments, usually in the form of stocks and bonds, are owned by millions of Americans. Some corporations have as many as 400,000 stockholders. Others like the neighborhood barber shop or grocery may have only one. Our own Electric Company has well over 24,000 stockholders, or roughly 10 times as many stockholders as employees.

Indirect investments in business are owned by even greater numbers—by the millions and millions who are bank depositors and insurance policy holders, for the funds which such institutions hold in trust are in turn invested in the country's business. And, of course, all money invested in building and loan stock by hundreds of thousands of people is loaned out to finance the building and buying of homes—a big business all in itself.

Capital is nothing more than saved up labor put to work in business. So if you have a bank account, an insurance policy, a share or two in the building and loan association or if you only rent the other half of your two-car garage, you are a capitalist because you have put your savings to work.

The billions and billions of dollars required for the establishment and expansion of American business do not, because they cannot, come alone from the coffers of the rich. They come in far the greatest part from the accumulated savings of millions of people—the same people who are the customers and the workers. They are the real capitalists.

PERSONALS

C. HAMILTON MOSES, 54, Little Rock, Ark., and former chief counsel of the Arkansas Power and Light Company, has been elected president of the company succeeding the late Harvey C. Couch, founder of the company.

Mr. Moses was born in Hampton, Ark., in 1887. He received his Bachelor of Laws degree from the University of Arkansas in 1911. He engaged in the practice of law before becoming attorney for the State Corporation Commission, which was then the regulatory body for public utilities. It was while serving as secretary to Governor Charles H. Brough from 1917 to 1919 that he met Harvey Couch, who had begun to develop the Arkansas Power and Light Company. Mr. Moses resigned from the Corporation Commission to enter the practice of law in Little Rock, taking over the legal business of Arkansas Power and Light Company. He has been chief counsel for the company nearly twenty years.

Mr. Moses is the second man to be president, although the company is nearly 30 years old. Harvey Couch, who founded it in 1913, served continuously as its president until his death last July. In view of his new position, Mr. Moses will immediately sever all his other business affiliations, which are many and varied.

L. N. ROBINSON, consulting engineer, has been appointed assistant engineer of the Puget Sound Power and Light Co., Seattle, Wash. From 1916 to 1919 Mr. Robinson was a member of the electrical engineering department at the University of California, Berkeley, and from 1919 to 1931 was associated with the Stone & Webster organization. He went into the consulting engineering field in Corning, N. Y., in 1933. Mr. Robinson is a fellow of the American Institute of Electrical Engineers.

HALSEY D. POLHEMUS, vice-president of the Jersey Central Power and Light Co., Asbury Park, N. J., has been elected executive vice-president of the company. Mr. Polhemus began his career as a newspaper man, but entered the utility field in 1923 starting first in the financial and promotion side of the business and later becoming identified with the holding and management branch. With the formation of Jersey Central Power and Light Co. in 1925 he returned to Asbury Park, where he had spent part of his journalistic career, from New York, becoming vice-president of the utility.

ROBERT R. BOLLINGER, formerly general auditor and assistant treasurer of the company, was named vice-president in charge of finance and as treasurer. A native of Philadelphia, Mr. Bollinger began his work in the utility business and management end of the American Railways Co., later the American Electric Power Co. As traveling auditor for American Electric Power, he was assigned to the Monmouth Lighting Co. at Keyport, N. J., a subsidiary company.

When Monmouth Lighting was merged with other companies to form the Jersey Central Power & Light Co. in 1925, Mr. Bollinger took up his work at the general office in Asbury Park, serving as general auditor, assistant treasurer, and now as vice-president.

JOHN C. SCHOLL, general superintendent of production, Pennsylvania Edison Co., Altoona, and dean of the company's employees, retired from service August 1 after completing 51 years of service in the electric utility field. Mr. Scholl will be succeeded by ELMER F. REED, who has been assistant superintendent of production since 1930.

Mr. Scholl joined the Edison Electric Illuminating Co., Altoona, as an engineer in 1890 and became chief engineer in 1902. In 1910 the Edison and another utility in the city were acquired by the Penn Central Light & Power Co. through Day & Zimmerman and Mr. Scholl was appointed assistant superintendent of power plants.

During the World War he was advanced to the position of general superintendent of production, the position he has held until the present time.

Mr. Reed entered the services of the Penn Central Light & Power Co. in 1922 as combustion engineer at the Williamsburg and Warrior Ridge plants. In 1923, when the Saxton plant was built, he was promoted to efficiency engineer at that plant. He left Saxton in 1928 and became efficiency engineer of all the Midwest Utilities corporations in Pennsylvania and Ohio. In 1930 he was appointed assistant to the general superintendent of production at Altoona, Pa., the position he occupied until the present time. Mr. Reed is a member of the Altoona Engineering Society and has served for ten years as a member of the prime movers committee of the Pennsylvania Electric Association.

LEO C. ROCHFORD, executive assistant to the vice-president of the Central New York Power Corp. at Potsdam, N. Y., has been appointed resident manager in Oswego, effective September 1, succeeding CARL F. MOWRY, who has been promoted to the position of power representative for the Utica district of the company. Mr. Mowry has been in Oswego since 1931, when he became new-business manager for the Oswego, Fulton and Pulaski areas. In 1938 he became resident manager. Mr. Rochford was formerly associated with the power company in Oswego as assistant superintendent of the electric department. In 1933 he was appointed safety and personnel director for the company.

RALPH A. BLOOMSBURG, who has been connected with the Niagara Hudson system for a number of years, has recently been made general manager of the Coal Merchants Mutual Insurance Co., New York.

F. C. WEISS, manager of the construction and engineering department of the Alabama Power Co., and J. S. HENKEL, assistant to vice-president, were elected vice-presidents of the company at a recent meeting of the board of directors. Four division managers, O. K. SEVFORTH, A. D. QUACKENBUSH, HENRY MAULSHAGEN and C. T. HUNTER, were elected division vice-presidents.

Mr. Weiss was educated at the University of Texas and the Massachusetts Institute of Technology, becoming associated with the Alabama Power Co. as assistant engineer on transmission line construction in 1913. After a short connection with Stone & Webster he returned to Alabama Power Co. as assistant operating engineer, subsequently becoming construction superintendent. Three years later he was made superintendent and construction manager of the Dixie Construction Co., and then was elected vice-president. In 1929 he was appointed construction manager of Allied Engineers, Inc., in charge of construction in the southern division. After the dissolution of Allied Engineers Mr. Weiss became engineering and construction manager for Alabama Power Co.

Following graduation from Missis-

sippi A. & M. College in 1912, Mr. Henkel spent three years with the General Electric Co. From 1916-18 he was engaged in construction and engineering work for the Citizens Electric Co. of Des Moines. Mr. Henkel joined the Alabama Power Co. as office engineer in the western division, subsequently serving in various capacities at Anniston, Gadsden and Montgomery. In 1927 he was promoted to division manager of the northern division at Huntsville. In the fall of 1940 he became connected with the executive department of the company as assistant to vice-president with various duties.

Mr. Seyforth became associated with the Alabama utility in 1917 and he engaged in construction work before his appointment as superintendent of the western division. He became manager of the western division in 1921 and two years later was transferred to Anniston as eastern division manager.

Mr. Quackenbush joined H. M. Byllesby & Company to do engineering work following graduation from Armour Institute of Technology. He was transferred to Mobile Electric Co. where he was soon made general superintendent, the position he held until Mobile Electric Co. was acquired by Gulf Electric Co. and later by Alabama Power Co. At that time he was named manager of the Mobile division.

Mr. Hunter joined Alabam Power Co. in 1923 in the western division. Subsequently he served as district manager at Jasper and was transferred in 1929 to Eufaula as manager for the southeast division.

Maryland Association Meeting

THE Mid-Year Meeting of the Maryland Utilities Association was held on Sept. 5 and 6, 1941, at the George Washington Hotel, Ocean City, Md. There were approximately two hundred sixty present.

On Saturday morning a combined meeting of the Transportation, Gas and Electric groups was held. They were addressed by well known speakers on subjects of present day interest. Saturday evening an informal banquet was held followed by an address by Dr. John L. Davis. The speakers and their subjects were all warmly received by those in attendance.

CONVENTIONS AND MEETINGS

SEPTEMBER

22-25	Illuminating Engineering Society, Atlanta Biltmore Hotel, Atlanta, Ga.
24-26	Indiana Electric Association, French Lick Springs Hotel, French Lick Springs, Ind.

OCTOBER

2	Meter and Service Committee, EEI, New Ocean House, Swampscott, Mass.
3	General Sales Committee, EEI Headquarters, New York, N. Y.
6-7	Prime Movers Committee, Hotel Statler, St. Louis, Mo.
6-8	National Electrical Contractors Association, Rice Hotel, Houston, Texas
6-10	National Safety Council's 1941 Congress and Exposition, Stevens Hotel, Chicago, Ill.
8-10	American Institute of Electrical Engineers, Coronado Hotel, St. Louis, Mo.
9	Commercial Electric Cooking Council Conference, Knickerbocker Hotel, Chicago, Ill.
12-15	American Society of Mechanical Engineers, Louisville, Ky.
13-14	Electrical Equipment Committee, EEI, Hotel Cleveland, Cleveland, Ohio
13-14	Wisconsin Utilities Association, Commercial and Technical Sections, Schroeder Hotel, Milwaukee, Wis.
14-17	National Electrical Wholesalers Association, Hotel Statler, Detroit, Mich.
19-24	American Welding Society, Bellevue Stratford Hotel, Philadelphia, Pa.
20-22	Transmission and Distribution Committee, EEI, Netherland Plaza Hotel, Cincinnati, Ohio.
20-22	American Gas Association, Atlantic City, N. J.
27-28	Accident Prevention Committee, EEI Headquarters, New York, N. Y.
27-31	National Electrical Manufacturers Association, Waldorf-Astoria Hotel, New York, N. Y.

DECEMBER

3-5	Congress of American Industry of the National Association of Manufacturers, Waldorf-Astoria Hotel, New York, N. Y.
3-5	American Institute of Electrical Engineers, Southeastern District, St. Charles Hotel, New Orleans, La.

Pennsylvania Convention

(*Continued from page* 392)

ment; weekday maintenance; replace underloaded transformers with smaller ones; maintenance scheduling; reduce requirements for new materials by better salvaging and standardization; use of clerical employees and women to fill in employment gaps.

Because of the post-emergency financial problems brought about by emergency expansion, C. R. Landrigan, Detroit Edison, suggested that this is the time to spend money so as to be able to cut expenditures when the load goes off. Among his suggestions were catching up on maintenance, getting ahead on such things as pole replacements and protective painting; increasing efficiency of plant and personnel; rebuilding manually operated equipment to auto-reclosing or remote control because of manpower shortage; disposing of unnecessary property while prices are good; refunding debt where interest rates warrant; increasing retirement and depreciation reserve; increasing contingency reserve to provide for possible tight money situation; accelerating sales to stable elements.

The annual safety awards were won this year by Metropolitan Edison and Natrone Light & Power Company.

After Seeing MKB's New Movie

(*Continued from page* 387)

the Bureau at 420 Lexington Avenue, New York City.

With the picture, the Bureau is offering a complete promotional campaign designed to help utilities and dealer groups build up the audiences for each showing, and to make the showings as effective and profitable as possible. Details of this program, descriptions of the promotional aids and color photographs from "It Happened in the Kitchen"—to show you the amazing realism attained in this picture—are contained in the Plan Book, obtainable upon application to the Bureau.

Meeting of Prime Movers Committee EEI

J. A. KEETH, *Chairman*

A MEETING of the Prime Movers Committee will be held in the Hotel Statler, St. Louis, Mo., on October 6 and 7. This will be the first meeting of the new committee for 1941-1942 and it is expected that plans will be made for the season's work.

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1941-1942

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Classification of Accounts, to be announced.

Customers' Relations, Commercial Accounting and Collections, to be announced.

Depreciation, to be announced.

Plant Accounting and Records, H. B. HARDWICK, The Commonwealth & Southern Corp., New York, N. Y.

Purchasing Stores and Transportation, to be announced.

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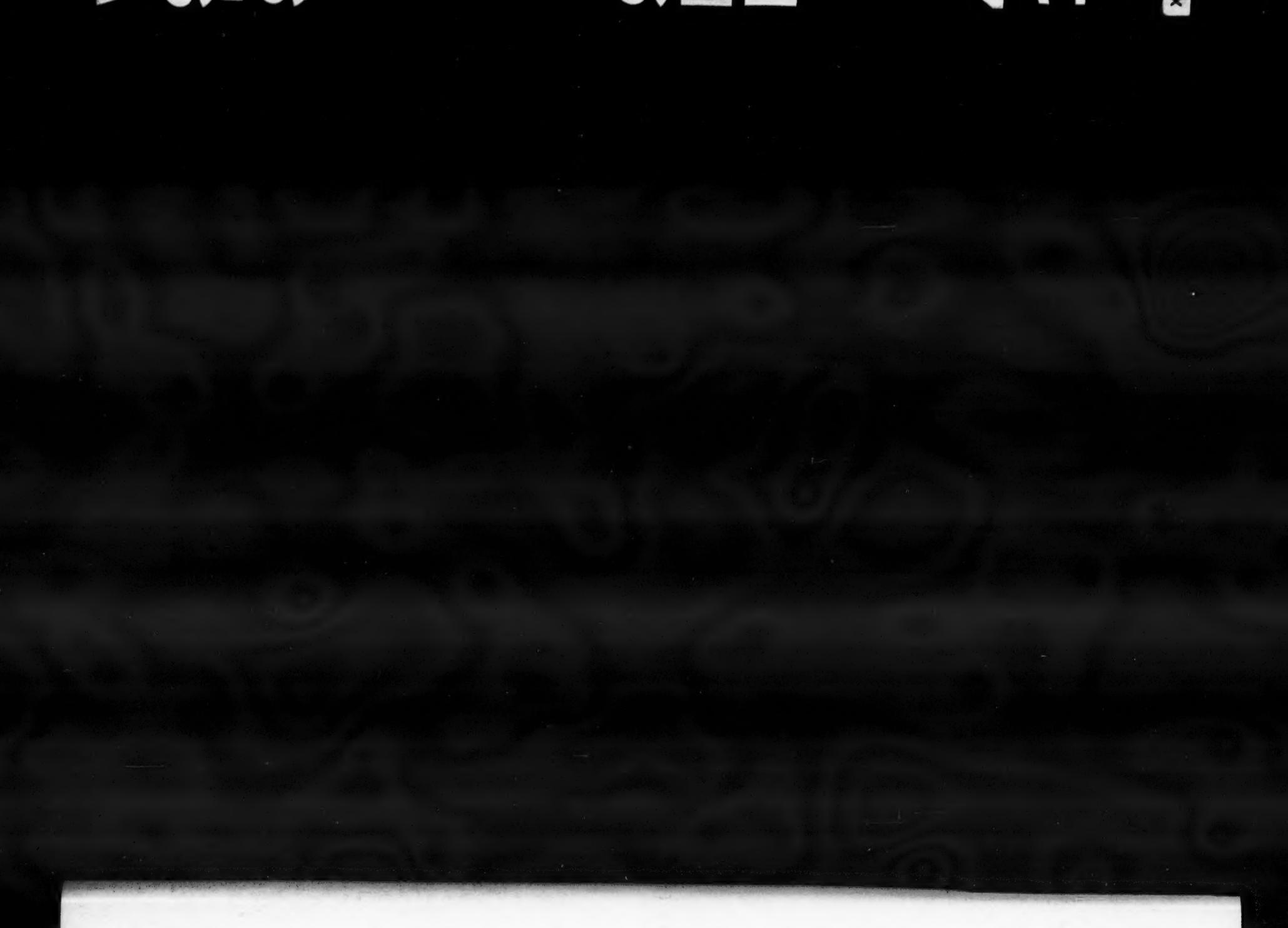
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